



# INSECT TRAPPING GUIDE



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ELEVENTH EDITION  
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Information for a target insect is listed under the type of trap used. Trap types are inserted in the guide alphabetically (AM, BW, ECB, EPSM, etc.).

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## SECTIONS

Apple maggot .....	AM
Boll weevil.....	BW
Caribbean fruit fly .....	MP
European corn borer .....	ECB
European pine shoot moth .....	EPSM
General fruit fly (ChamP™ Trap) .....	CP
General fruit fly (McPhail Trap) .....	MP
Guava fruit fly .....	OF
Gypsy moth .....	GM
Japanese beetle .....	JB
Khapra beetle .....	KB
Mediterranean fruit fly (Jackson Trap) .....	MF
Mediterranean fruit fly (Yellow PanelTrap) .....	MFP
Mediterranean fruit fly (IPMT Trap) .....	IPMT
Melon fly .....	ML
Mexican fruit fly .....	MP
Peach fruit fly .....	OF
Olive fruit fly .....	OLFF
Oriental fruit fly .....	OF
Western cherry fruit fly .....	AM



## INTRODUCTION

This trapping guide has been developed as a reference for use in state/county insect trapping programs. It contains essential information needed by trappers to properly place, service, and maintain their traps. Each trapper must be thoroughly familiar with these procedures. If more information is needed, consult your supervisor, detection entomologist, or numerous existing references.

The pages have been prepared in loose-leaf form to accommodate future revisions as trapping techniques are refined or improved. Procedures can be expected to change, or be subject to special modifications, as research or experience dictates. Modifications or changes are to be cleared through your detection entomologist. Any suggestions for improvements would be welcomed by the Pest Detection/Emergency Projects Branch.

Additionally, all the requirements of the state/county contracts for trapping which concern records, maps, reporting, etc., must be followed. While these instructions are designed to assist county and state personnel with trapping procedures, they are not intended to be in lieu of requirements in the contracts.

## TRAPPERS' RESPONSIBILITIES

### Trap Line:

1. Know and follow the information in the "Insect Trapping Guide" (ITG)!
2. Recognize host plants and know the relative host preference of the target pest.
3. Place and service traps according to the ITG.
4. Perform required trap relocations.
5. Maintain proper trap distribution.
6. Run trap line with efficient route order and complete route on schedule.
7. Keep distribution maps current with accurate trap locations.
8. Maintain trap cards with accurate map drawings, trap locations, host information, and service records.
9. Avoid contamination of the traps.
10. Make effective use of piggybacking (page vii).
11. Remove all traps from the field at the end of the trapping season.

### Public Relations:

1. Maintain a good public image in appearance and conduct.
2. Make proper contacts with the homeowner before trap placement.
3. Be considerate of people and their property.
4. Display courteous driving habits.

### Procedures:

1. Know the proper procedures for handling, documenting, and submitting specimens.
2. Report suspect finds to the county entomologist or your supervisor.
3. Use the proper chain of command.
4. Maintain equipment and supplies.
5. Properly dispose of trash, old traps, and components.
6. Quickly implement new policies and procedures.

### Records:

1. Keep an accurate summary sheet daily.
2. Record vehicle mileage each day.
3. Maintain the required host site list for relocation and delimitation.

### Vehicles:

1. Use safe driving practices and keep vehicles clean and properly serviced.

## **SUPERVISORS' RESPONSIBILITIES**

Supervisors are ultimately responsible for all work being performed properly and in a timely manner. The following items need close attention.

### **Specific Orientation:**

Supervisors should be sure that all employees are given program orientation and periodic review training over the trapping season. They should understand information such as:

1. Recognition of the insects and their hosts;
2. Methods of probable introduction into California;
3. Basic biology of target pest;
4. Economic damage;
5. Knowledge of the traps and how they work;
6. Limitations of the traps; and
7. Information contained in the ITG.

### **Record Keeping:**

Trapping books, maps, specimen submission data, etc., must be absolutely accurate. City and county wall maps, based on the State Plane Coordinate system, visualizing trap density and workload must be kept (see page iv). Experience has shown that inaccurate or insufficient records can create additional problems.

### **Public Relations:**

All employees should have a good concept of public relations, and understand the importance of public support for the program.

### **Field Supervision:**

Supervisors shall perform at least two quality control checks annually to monitor trappers' work performance, and keep written records to assure that the requirements of the ITG are followed by:

1. Riding with employees on a regular schedule;
2. Performing periodic unscheduled checks on employees' work;
3. Having all sticky inserts double-checked before disposal; and
4. Explaining to employees how their work can be improved and informing them of what they are doing well.

### **Safety:**

It is the supervisors' responsibility to instruct employees in the safe operation and use of all equipment, supplies, and vehicles. Supervisors should perform the following:

1. Periodic checks to assure that employees are performing their functions in a safe manner;
2. Checks to assure that vehicles are maintained in a safe condition;
3. Checks to ascertain that vehicles are operated safely;
4. Provide a list of emergency medical treatment centers to employees;
5. Ensure that trappers have in their possession a copy of the Special Local Need (SLN) and pesticide label; and
6. Ensure that trappers are aware of, and follow, all pertinent pesticide safety regulations, including the disposal of used dibrom wicks.

## TRAPPING PROGRAM WORKING WALL MAP

1. This map will be useful in initially setting up the trapping program, determining accurate personnel needs (based on realistic trapper workload), and making the route adjustments that are required during the course of the season as a result of increased/decreased workload.
2. The map, covering all of the trappable areas in the county and located on the wall of the trapping office, should be of sufficient scale (at least 2" to the mile) to legibly enter trap numbers.
3. The map is overlaid with non-glare mylar. Non-permanent markers are used to note trap densities and temporary route boundaries directly on the map. Use 1/16" graphic tape to mark permanent route boundaries once they are established.
4. Along the western border of each square mile, projected trap totals (as pre-determined by the trapping supervisor) are indicated in the order listed in the example (page v). These figures act as a "placement assignment" from the supervisor to the trapper, shifting the responsibility for adequate trap density from the trapper to the supervisor, where it belongs. This placement assignment is then transferred from the map to a written document, lending itself to be more easily utilized by the trapper in the field.
5. The number in the center of each square mile is the projected number of total trap servicings required per week for that square mile. For example: if five MF Jackson, five McPhail, two ChamP™, 5 OF Jackson, 5 ML Jackson, two JB and two GM traps are projected for a square mile and five of those traps are on a weekly servicing schedule while the others are on a bi-weekly schedule, the number of projected servicings per week would be 15.5.
6. Using only the projected servicings per week number in the center of each square mile, the trapping supervisor can easily determine how many and which square miles need to be grouped together into one day's work (based on an acceptable number of trap servicings per day) and from there into one week's work (i.e. one trapper's "route").
7. As the trapper deploys traps in the field, the eastern side of the square mile is filled in by the trapper at the end of each day to reflect the actual number of traps, of each type, in each square mile. Comparing the "projected" to the "actual" numbers will give the supervisor an idea as to whether the right number of traps are being deployed. If the "projected" does not match the "actual" (which is probable in some situations), the supervisor then needs to question the trapper and verify that either the "projected" or the "actual" is more realistic and/or attainable.
8. Once the trapping supervisor determines the final number in each square mile, and the trapper has deployed traps and noted them on the eastern side of the square mile to match that determination, the "projected" and the "actual" numbers should match. This can be achieved by adjusting either of the two numbers, whichever is appropriate.
9. Current trap locations (distribution) would not be required on this map. Distributions would still be maintained on the field route map or the square mile map (kept updated daily) associated with each route binder.



**MORE EXAMPLES OF HOW TO DETERMINE  
“PROJECTED TRAP SERVICINGS/WEEK”**

The projected trap servicings per week will change based on the projected number of traps allocated for each square mile and/or a change in the servicing interval required for each of the trap types.

Using the projected trap numbers from the sample square mile (page v), assume that all of the traps are on a weekly servicing cycle. If so, the projected trap servicings per week would be the total number of traps projected for that square mile: 26.

Using the same trap numbers, assume that all of the traps are on a bi-weekly servicing cycle. The projected trap servicings per week would then be the total number of traps projected for that square mile divided by two: 13.

Using the same trap numbers, assume that 5 MP traps are on a weekly servicing cycle; 5 MF, 2 CP, 5 OF, 5ML, 2 GM and 2 JB traps are on a bi-weekly servicing cycle. The projected trap servicings per week would be the sum of the two different servicing cycles: (a) the total of the weekly servicings: 5; and (b) the total of the bi-weekly servicing cycles divided by two: 10.5. Adding these two different figures together would result in a projected trap servicings per week of 15.5.

**NOTE:** When determining “projected trap servicings per week”, the most frequent servicing schedule is the unit of time that should be used as the basis for the determination. For example, if your program has traps that need to be serviced weekly, then “...servicings per week” need to be figured. If, on the other hand, your program only has traps that are serviced every two weeks, then “...servicings per two weeks” need to be figured.

## HOW TO PIGGYBACK TRAPS

Piggybacking of traps (more than one type of trap on the same property) has several economic advantages. Any biological limitations can be minimized if the following guidelines are followed:

1. Plan well in advance the trap groupings which will be acceptable. Several considerations are:
  - a. The property to be trapped must meet the host needs for all traps which will be piggybacked (e.g., gypsy moth, apple maggot, and Japanese beetle traps grouped together or Medfly and Oriental fruit fly trap groupings).
  - b. Use of adjoining properties as trap sites is acceptable and is nearly as efficient as piggybacking.
  - c. Maintain an even distribution of traps, provided hosts are available.
  - d. Avoid competition between different attractants. A distance of 10 feet or more separating traps with male attractants should be maintained.
  - e. Do not place any fruit fly trap onto a property on which a similar fruit fly trap was placed within the last 12 months.
2. A few examples of piggybacking traps within a one-square-mile urban area are detailed in Figures 1- 4. Keep in mind that the McPhail, Champ™ and AM traps can also function as general purpose fruit fly traps, particularly for females, immature flies, or other fruit fly species for which there is no specific trap. By not using them on the same properties as the medfly, oriental, or melon fly traps, the trap density is increased for these three flies. McPhail traps are not to be piggybacked with other fruit fly traps in “other urban areas”, except as directed in the specific sections.

## HOST SELECTION

Front yard hosts for trap placement are frequently selected over back yard hosts because of easier access for the trapper. This practice is acceptable, providing that the best host is utilized. The best host can be defined by the criteria in this guide for the specific pest. Convenience is a factor only if all criteria are equal between hosts. Earlier detection may be compromised by favoring front yard hosts at the exclusion of better hosts in back yards. Traps shall be placed in the best host available.

## DEFINITIONS

**Urban** - areas with more than 500 homes per square mile.

**Rural Residential** - areas with 25 to 500 homes per square mile in a scattered distribution.

**Rural** - areas with less than 25 homes per square mile in a scattered distribution.

To determine the trapping season and the trap density, the following geographic areas have been designated.

**Southern California** - Coastal San Diego County, Orange County, Riverside County west of Banning, Los Angeles County except for the Antelope Valley, Ventura County except the mountains, coastal Santa Barbara County, southern coastal San Luis Obispo County, and the Chino Plain area of San Bernardino County (generally this is metropolitan San Bernardino County up to the forest line).

**Southern San Francisco Bay Area** - Urban areas in the counties of Alameda, Contra Costa, San Benito, San Francisco, San Mateo, and Santa Clara.

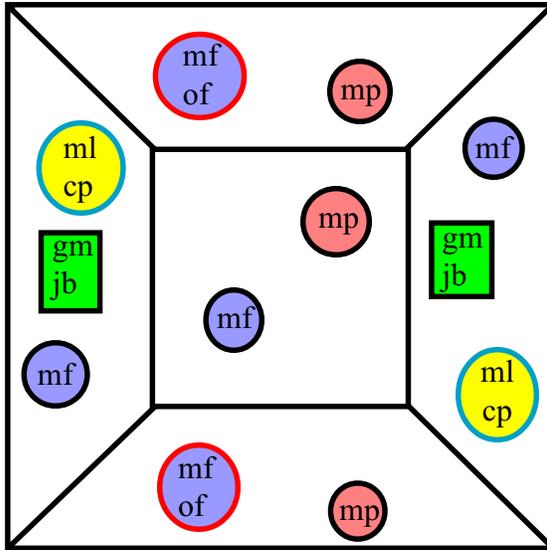
**Other Urban Areas** - Urban areas in the Napa, Salinas, and San Joaquin Valleys; the Sacramento Valley including the cities of Redding, Anderson, Cottonwood and Red Bluff; Lake, Marin, Mendocino, Solano, and Sonoma Counties; northern San Luis Obispo County; the Coast Range and Sierra foothills; high deserts (e.g., Antelope Valley), and the Coachella and Imperial Valleys. All areas trapped are below 1,500 feet in elevation.

**Mountain and Northern Counties** - All that area of the state above 1,500 feet elevation, desert areas (except the Coachella and Imperial Valleys) and all areas north of a line drawn horizontally across the state just below the city of Red Bluff, excluding the cities of Anderson, Cottonwood, Red Bluff, and Redding.

**Trapping Activities** - All activities that relate to trap placement and servicings, including hiring and training of seasonal personnel. Those counties trapping for six months, trapping activities begin May 1 and end October 31. Those counties trapping for eight months, trapping activities begin April 1 and end November 30. There are no starting or ending dates in counties trapping for twelve months. Trapping activities in Imperial and eastern portions of Riverside Counties are arranged by agreement with the CDFA Area Manager.

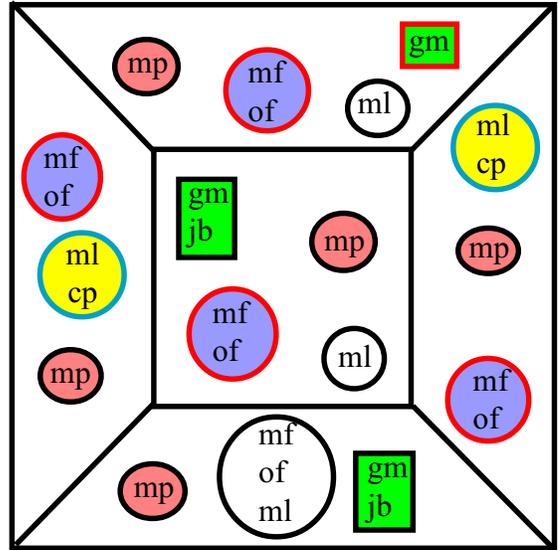
## EXAMPLES OF PIGGYBACKING TRAPS

- Relocation not required
- Relocation required



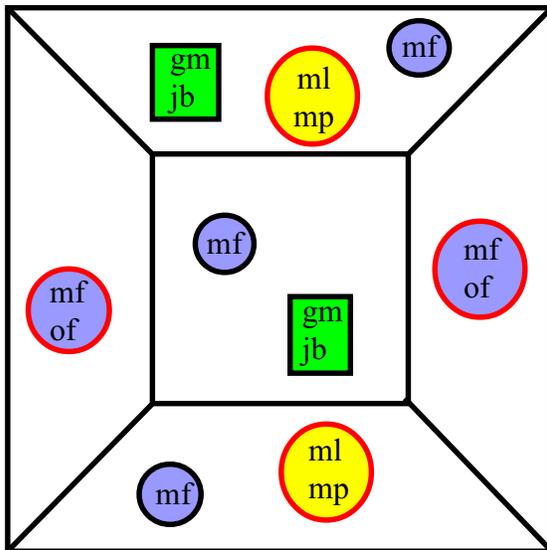
**Figure 1.**

Other Urban Areas - with three  
McPhails and two Champ traps



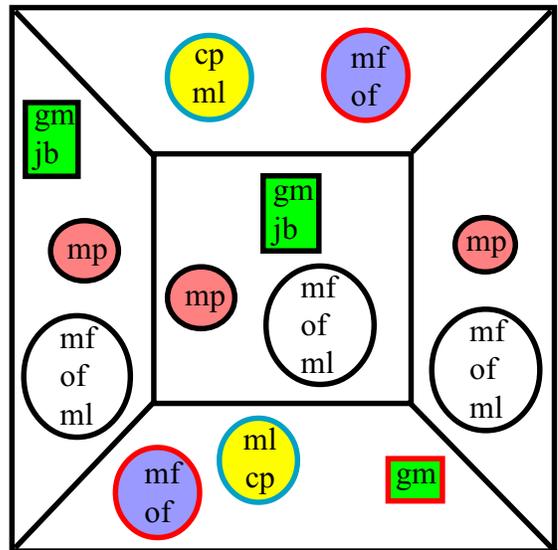
**Figure 2.**

Southern San Francisco Bay Area  
and Southern California



**Figure 3.**

Other Urban Areas - with two McPhail  
traps



**Figure 4.**

Los Angeles and Orange Counties

## RECORD KEEPING AND TRAP MAINTENANCE

Detailed trapping information is generally kept on trap cards, samples of which are shown on pages xvi, xvii and xviii. A good trap card includes the following information:

1. Identity of each trap as to type, with a unique trap number based on the square mile grid system.
2. The exact location of trap, i.e., county, city, address, and location on property.
3. A history of trap servicing, including dates, inspector, relocations, and samples submitted.

When recording information, give close attention to the following details:

1. Always use pencil to record information.
2. Include a written description of the location of the trap on the property. A more detailed description will be needed for those locations that are not easily found or for unusual circumstances (i.e., dogs).
3. Draw property diagram maps with "north" ↑ toward the top border. Indicate north on each map with an "N."
4. Label the street name where trap is placed, as well as at least one close cross street. Always denote "street," "drive," "avenue," etc.
5. Always denote the city.
6. Sketch recognizable structures on property chosen for trapping.
7. Sketch recognizable landmark structures and note distances in undeveloped areas, or when an address is not available.
8. Name the host and mark its approximate location on the property.
9. Record trap information immediately after servicing. Do not wait until a later time.
10. Maintain a host list of up to 100 sites per square mile for relocation and delimitation purposes. The trap card (Form 60-202) can suffice for this purpose.
11. Trap cards should be arranged in separate, single-day routes and in an efficient driving order.

## RECORD KEEPING AND TRAP MAINTENANCE MISTAKES

Experience in trapping programs has shown the following to be common mistakes:

### Trap Cards:

1. Lack of neatness and clarity.
2. Incorrect designation of north (N) on trap cards.
3. Square mile grid number does not correspond to trap number on trap card. Watch out for transposing numbers.
4. Incorrect or omission of location letter or number in the map column or row, i.e., A, B, C, D, etc.
5. Stapling one card to another. If cards separate, a complete record is not on one card.
6. Failure to write a complete address. Include house number if available. Do not say "Between address A and address B." Find out which property the tree is on.
7. Incorrect name of city.

### Inserts (Jackson trap only):

1. Number on trap does not correspond to number on insert.
2. Melon fly and Oriental fruit fly trap inserts are not designated with an "ML" or an "OF" to distinguish them from Medfly trap inserts.
3. Date of insert placement is not marked.
4. Inserts are not replaced often enough. They should be replaced after one month, or sooner if needed.

### Traps:

1. Failure to mark trap number, placement date, servicing dates, and an indication of when previous rebaiting occurred, if applicable.
2. Failure to rewrite a trap number that has faded. This problem is alleviated by using permanent ink markers, i.e., black Sharpie pen.
3. Failure to replace the Jackson trap body when all space for servicing dates is used, or when trap bodies become soft due to weathering.
4. Failure to replace contaminated traps.
5. Failure to number and date Pherocon AM traps. Write the trap number and date of placement on the non-sticky side of the trap. Servicing date can be placed on border of sticky side.

## SUBMITTING SPECIMENS FOR IDENTIFICATION

The Standard Form 65-020, "Pest and Damage Record", (see page xiii) must be completed and a copy must accompany all specimens submitted for identification. However, prior to submitting the specimen, the electronic version of the form 65-020 (e-PDR) must be completed. The website for the e-PDR is <http://phpps.cdfa.ca.gov>. Persons submitting this form will need a username and a password. Double check for accuracy the address number, street name and city when a "find" is made. For trapped specimens, place the trap number in the "Remarks" area. For sticky-type traps the entire trap, the sticky portion only, or a cut-out from the trap are all acceptable means of submitting specimens for identification. Consult your supervisor. In any case, care should be taken not to damage the specimen. The entire trap or insert need not be submitted for insects which are known sterile "plants". For specimens collected from a McPhail, or a dry trap, refer to specific instructions for the insect involved.

Immediately contact the district entomologist after trapping a suspect feral target insect. Suspect specimens should be sent to Sacramento by the quickest means possible. Priority samples should be sent via scheduled bus line or airline. Non-priority samples (including QC "plants") should be sent under the following restrictions:

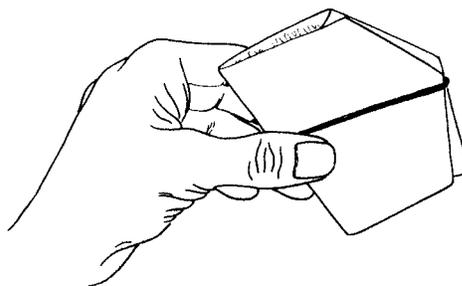
1. Vials containing 70% isopropyl alcohol, a flammable liquid, cannot be mailed via the United States Postal Service using air transportation.
2. Alcohol vials can be mailed First Class as long as the package is clearly marked above the address: "SURFACE MAIL ONLY."

A suggested method for folding a Jackson trap insert is depicted below (Figs. 1 and 2). Bend the long corners of the insert inward, fold the insert and use a rubber band to hold it closed. Check first to see that the specimen will not be damaged using this method (ChamP™ traps can be folded in a similar manner). Put the insert in a plastic bag before sealing in a box for mailing. Alternate methods for submitting the insert may be necessary, depending upon the location of the specimen on the insert.

**REMEMBER! INCORRECT DATA FOR SUBMITTED SPECIMENS IS INEXCUSABLE.**



**FIGURE 1.**



**FIGURE 2.**

**STANDARD FORM 65-020  
PEST AND DAMAGE RECORD**

 <p><b>STATE OF CALIFORNIA</b> DEPARTMENT OF FOOD AND AGRICULTURE PLANT HEALTH AND PEST PREVENTION SERVICES</p> <p><b>PEST AND DAMAGE RECORD</b> 65-020 (11/99/02)</p>		<b>PDR NUMBER</b> <span style="font-size: 1.5em; color: red;">1291603</span>		<b>Date collected</b> _____
		<b>Lab</b> <input type="checkbox"/> ENTO <input type="checkbox"/> PLANT PATH <input type="checkbox"/> NEMA <input type="checkbox"/> SEED <input type="checkbox"/> BOTANY <input type="checkbox"/> VERT		<b>Time</b> _____
<b>NOR Number:</b> _____		<b>Number of samples:</b> _____		
<b>Location</b> Name: _____	<b>Collector</b> F   S   C   E   M   D   Describe other: _____		<b>Activity</b> Address/Physical description: _____	
<b>Situation</b> City: _____ State: _____ Zip code: _____	<b>Specimen description</b> Name: _____		<b>Address</b> _____	
<b>Section</b> County: _____	<b>City</b> _____ Zip code: _____		<b>State/Country</b> _____	
<b>Township</b> N _____ S _____ <b>Range</b> E _____ W _____	Phone: _____ Fax: _____ Latitude: _____	City: _____ Zip code: _____		State/Country: _____
<b>Base and meridian</b> N M S _____	E-mail: _____ Longitude: _____	Phone: _____ Fax: _____ Latitude: _____		E-mail: _____ Longitude: _____
<b>Domestic origin (where first grown)</b> City: _____ County: _____ State/Country: _____ Zip code: _____		<b>Genus (ground/airborne)</b> Business name: _____ Flight number: _____		
<b>Shipment size (include units)</b> _____ Program: _____		License plate: _____ License state: _____ Tariffing number: _____		
<b>Number remarks</b> _____ _____ _____		<b>General or Plant Pathology</b> Number of <input type="checkbox"/> plants <input type="checkbox"/> acres involved: <input type="checkbox"/> Number <input type="checkbox"/> Percent of plants affected: Plant distribution: <input type="checkbox"/> Limited <input type="checkbox"/> Scattered <input type="checkbox"/> Widespread <input type="checkbox"/> Evacuated <b>Plant parts affected:</b> <input type="checkbox"/> Bark <input type="checkbox"/> Buds or cones <input type="checkbox"/> Leaves, upper surface <input type="checkbox"/> Blooms <input type="checkbox"/> Fruit or nuts <input type="checkbox"/> Petals <input type="checkbox"/> Stem <input type="checkbox"/> Branches, large <input type="checkbox"/> Growing tips <input type="checkbox"/> Nodes <input type="checkbox"/> Trunk <input type="checkbox"/> Branches, terminal <input type="checkbox"/> Large roots <input type="checkbox"/> Seeds <input type="checkbox"/> Tubers <input type="checkbox"/> Roots <input type="checkbox"/> Leaves, lower surface <b>Dist. symptoms:</b> <input type="checkbox"/> Center <input type="checkbox"/> Girdling <input type="checkbox"/> Malformation <input type="checkbox"/> Saw damage <input type="checkbox"/> Die back <input type="checkbox"/> Internal discoloration <input type="checkbox"/> Marginal burn <input type="checkbox"/> Shading <input type="checkbox"/> Fruit rot <input type="checkbox"/> Leaf fall <input type="checkbox"/> Root rot <input type="checkbox"/> Sucker outages <input type="checkbox"/> Fruit spot <input type="checkbox"/> Leaf reddening <input type="checkbox"/> Rough bark <input type="checkbox"/> Wilting <input type="checkbox"/> Galls <input type="checkbox"/> Leaf spot <input type="checkbox"/> Shot holes <input type="checkbox"/> Yellowing		
<b>Subject</b> _____	<b>Send report to:</b> _____			
<b>Host or substrate</b> Average: <input type="checkbox"/> Nut <input type="checkbox"/> Other				
<b>Extraction</b> Trap number: _____ Bag number: _____ Last extraction date: _____ Latitude: _____				
Trap type: _____ Trap density: _____ per _____ Longitude: _____				
Total pest count or number per (leaves, leaf, stem, trap, root, stem, etc.)   Survey method: Count: _____ per _____				
Conditions: <input type="checkbox"/> Dead <input type="checkbox"/> Alive <input type="checkbox"/> Unknown Stages: <input type="checkbox"/> Egg <input type="checkbox"/> Larva <input type="checkbox"/> Nymph <input type="checkbox"/> Pupa <input type="checkbox"/> Adult				
<b>Setting</b> (Lot number)   (Host type (tree, soil, etc.))				
<b>Shipping name</b> Common name: _____ Type (plants, fruit, seeds): _____				
Scientific name: _____ Quantity: _____ Units: _____				
Container size: _____ Container units: _____				
Home field block:   commercial   foundation   increase				
<b>PDR NUMBER</b> <span style="font-size: 1.5em; color: red;">1291603</span>		<b>Collected by:</b> _____		
		<b>Date:</b> _____		

**TYPE OF SPECIMEN**   1291603

← PLACE THIS TAG IDENTIFER ON VIAL →

**TYPE OF SPECIMEN**   1291603

← PLACE THIS TAG IDENTIFER ON VIAL →

**TYPE OF SPECIMEN**   1291603

← PLACE THIS TAG IDENTIFER ON VIAL →

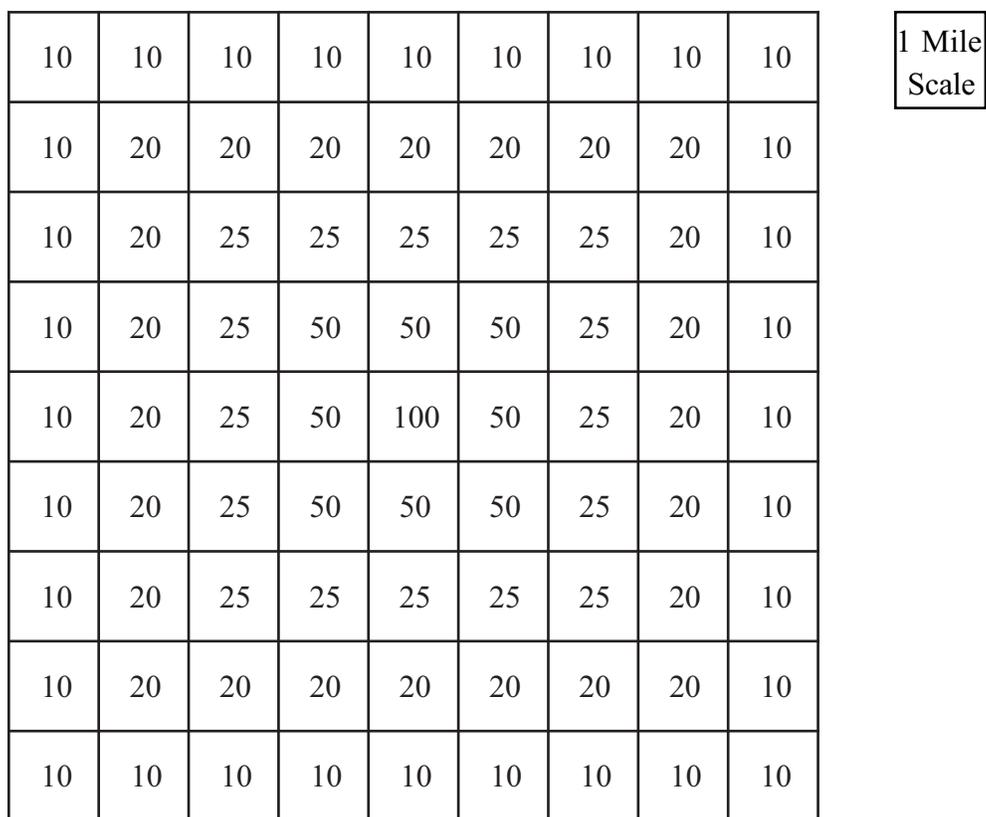
**TYPE OF SPECIMEN**   1291603

← PLACE THIS TAG IDENTIFER ON VIAL →

## DELIMITATION SURVEY - GUIDELINES FOR MAPPING

When a target insect is discovered in a trap, it becomes necessary to determine if an infestation exists, and the exact size of the infestation. For this purpose, predetermined delimitation grids and trap densities have been established. These grids may be found within the text for each given species. Both the trapping densities and size of the area to be delimited will vary, depending on the insect. The example used here is for Medfly. For more detailed delimitation guidelines, see the Medfly Delimitation Plan.

1. Plot the find site (the property where the target insect was trapped) on a map of the area to be delimited. The map may be a new map or the existing detection trap location map. If a new map is used, continue the same grid and numbering systems employed for detection traps.
2. If the find site is located at or near the center of a grid, then the delimitation trap densities can be established as outlined for each target pest (Fig. 1).



**FIGURE 1. A DELIMITATION GRID FOR MEDFLY SHOWING INCREASED JACKSON TRAP DENSITY PER SQUARE MILE**

3. If the find site is on or near a grid line or corner (as indicated by "X" in Fig. 2 through 4), adjust the trap densities as shown.

10	10	10	10	10	10	10	10	10
10	20	20	20	20	20	20	20	10
10	20	25	25	25	25	25	20	10
10	20	25	50	50	50	25	20	10
10	20	25	50	$\frac{25}{100}$ X	50	25	20	10
10	20	25	50	$\frac{25}{25}$	50	25	20	10
10	20	25	25	25	25	25	20	10
10	20	20	20	20	20	20	20	10
10	10	10	10	10	10	10	10	10

FIGURE 2.

10	10	10	10	10	10	10	10	10
10	20	20	20	20	20	20	20	10
10	20	25	25	25	25	25	20	10
10	20	25	50	50	50	25	20	10
10	20	25	25	$\frac{100}{25}$ X	25	50	25	10
10	20	25	50	50	50	25	20	10
10	20	25	25	25	25	25	20	10
10	20	20	20	20	20	20	20	10
10	10	10	10	10	10	10	10	10

FIGURE 3.

1 Mile  
Scale

10	10	10	10	10	10	10	10	10
10	20	20	20	20	20	20	20	10
10	20	25	25	25	25	25	20	10
10	20	25	50	50	50	25	20	10
10	20	25	38	$\frac{100}{38}$ X	38	50	25	10
10	20	25	38	38	38	50	25	10
10	20	25	25	25	25	25	20	10
10	20	20	20	20	20	20	20	10
10	10	10	10	10	10	10	10	10

FIGURE 4.

This method of adjusting trap densities for delimitation will not alter the size of the delimitation area, or change the total number of traps. It will also provide that the original grids and corresponding grid numbers are maintained. High trap numbers in the area around the initial find are maintained.





**Property Record Card and Rural Trapping Data Card  
(Form 60-200A and 60-204)**

**RURAL TRAPPING DATA CARD**

R74  
GROUP NO.

ENTER MILE GRID NUMBERS INCLUDED ON THIS DATA CARD

TRAP	GRID NUMBER	MAP	MF	INSP	DATE	HOST
1	2823	A	P	RB	4-15	Plum
2	2924	D	P NT	RB	5-16	Apricot
3	2925	B	P NT	AG	6-17	Peach
4	3223	A	P NT	AG	7-15	Peach
5	2824	C	P NT	AG	8-16	Apple
6	2923	D	P NT	AG	9-15	Fig
7						
8						
9						
10						
11						

**LEGEND:**  
 ✓ = INSPECTED  
 B = BAITED  
 I = NEW INSERT  
 W = NEW WICK  
 NT = NEW TRAP  
 M = TRAP MISSING (INT, RL, or RM)  
 P = PLACED  
 R = ROTATED  
 RL = RELOCATED  
 RM = REMOVED  
 US = UNABLE TO SERVICE  
 FN = PRE-NOTICE  
 NC = NO CONTACT  
 S = SAMPLE SUBMITTED  
 C = CONTACT  
 SF = SERVICE OVER FENCE  
 FY = FRONT YARD

**GRID 2923**

COUNTY: 50

Address: 16492 Carpenter Rd

City: E. of Grayson

Comments: Service over fence. Bad dog!!!

LOC: (3)

RF: (C)

HOST: Peach

LOC: Orange

TRAP 1-11

**GRID 2923**

COUNTY: 50

Address: 16943 Carpenter Rd

City: E. of Grayson

Comments: Enter through gate left side

LOC: (D)

HOST: Lognet

LOC: B

TRAP 1-11



**For poison on the skin:**

1. Remove contaminated clothing.
2. Drench skin with water (shower, faucet, hose, etc.).
3. Wash the affected area of the body thoroughly with soap and water; promptness in washing is most important in reducing the extent of exposure.
4. Put contaminated clothing in a plastic bag to prevent repeat exposure.
5. Notify your supervisor of the accident.

**For poison in the eyes:**

1. Hold eyelids open, wash eyes IMMEDIATELY with a gentle stream of clean running water. Use large amounts of water. DELAY OF A FEW SECONDS CAN INCREASE EXTENT OF EXPOSURE.
2. Continue washing for 15 minutes or more.
3. Do not use chemicals or drugs in wash water; they may increase the extent of injury.
4. Contact the nearest emergency treatment center from the list provided by your supervisor and bring the pesticide label to the treatment center.
5. Notify your supervisor of the accident.

Itemized below is a suggested list of equipment, useful in the operation of the traps discussed in this Guide.

1. Six foot pole with a hooked end for hanging traps
2. Pliers
3. Forceps
4. Sharpie marker (or similar permanent marker)
5. Hammer and nails (boll weevil trap only)
6. Pocket knife
7. Hand lens
8. \* "Insect Trapping Guide"
9. \* Property record cards (form 60-203) and trap data cards (form 60-200)
10. Flagging tape
11. \* Alcohol vials
12. \* Dry vials
13. Rubber bands
14. Plastic bags for used traps, wicks, and other garbage
15. Pencils and pens
16. \* Trap components
17. Utility tray for carrying supplies
18. Hand cleaner and paper towels
19. Safety equipment
20. Informational notices to property owners (i.e., State forms 60-215, 60-216, 60-217 or appropriate county forms).
21. Clipboard

Note: (\*) designates items provided by CDFA

## PESTICIDE USE LABELING REQUIREMENTS

Section 6602. Title 3 of the California Administrative Code states:

“6602. Availability of Labeling.

A copy of the registered labeling that allows the manner in which the pesticide is being used shall be available at each use site.”

The lures for Oriental fruit fly and melon fly contain dibrom. Dibrom product labels and material safety data sheets (MSDS) are available from the county agricultural commissioner. The dibrom product label, the Special Local Need (SLN) registration and the MSDS must be in the possession of each trapper at the time the wick is baited. The SLN document is reprinted on the following pages. MSDS sheets are available through the CDFA Meadowview office in Sacramento.

**DEPARTMENT OF PESTICIDE REGULATION**

James W. Wells, *Director*

1020 N Street, Room 332  
Sacramento, California 95814-5604

SLN #CA-760221



November 6, 1995

**REGISTRATION FOR SPECIAL LOCAL NEED AMENDED\*  
FOR DISTRIBUTION AND USE ONLY WITHIN CALIFORNIA**

Trade Name: Valent Dibrom 8 Emulsive                      EPA Reg. No.: 59639-15-AA

Firm Name: Valent U.S.A.

**DIRECTION FOR USE**

It is a violation of federal law to use this product  
in a manner inconsistent with its labeling.

Location: Statewide

Crop/Site/Commodity: For use in insect traps.

Target Pest/Problem: Fruit flies in the family Tephritidae.

Dosage: For initial baiting, apply 5 milliliters of appropriately diluted product (see dilution rate) to absorbent wicks which are part of insect traps. An additional 2 milliliters of diluted product may be added to the wick at not less than 10 day intervals. See Frequency/Timing below for additional information.

Dilution Rate: Dilute product to 1, 5, or 25 percent active ingredient with an approved<sup>2</sup> lure for the target pest. Ordinarily, a 1% mixture is used for oriental fruit fly detection trapping, and a 5% mixture is used for melon fly detection trapping. A 25% mixture is used for eradication trapping. For one quart of:

- 1% Mix 0.5 ounces (15.2 ml) of product with 31.5 ounces (930.8 ml) attractant.
- 5% Mix 2.6 ounces (76.3 ml) of product with 29.4 ounces (869.7 ml) attractant.
- 25% Mix 12.9 ounces (381.5 ml) of product with 19.1 ounces (564.5 ml) attractant.

<sup>2</sup>The California Department of Pesticide Regulation requires that insect lures used for pest eradication (versus detection) be registered.

\* This label supersedes the SLN label issued October 17, 1995.

Method of Application: Apply diluted material to wicks using an appropriately calibrated dispenser, such as a dropper or syringe.

Frequency/Timing of Application: After initial baiting, an additional 2 milliliters of diluted product may be added to wicks at intervals of approximately 10 or more days. If previously applied material has crystallized, do not add more material. Replace the wick with a new one and 5 milliliters of appropriately diluted material.

Field Reentry After Application: Not Applicable

Preharvest Interval: Not Applicable

Other Requirements: Applications listed in this registration are for California pest detection, quarantine and eradication purposes only, and must be conducted by or under the direct supervision of a federal, state, or county authorized personnel.

Valid until withdrawn, suspended or cancelled by the United States Environmental Protection Agency (USEPA), the manufacturer, the 24(c) registrant, or the Department of Pesticide Regulation.

All applicable directions, restrictions, and precautions on the USEPA-registered label(s) are to be followed.

This labeling must be in the possession of the user at the time of pesticide application.

The County Agricultural Commissioner's (or designee's) signature must be obtained prior to this use. This does not constitute a recommendation of the Department of Pesticide Regulation and will not prevent quarantine action if illegal residues are found on or in the crop.

Neither the Department nor the county agricultural commissioner, the manufacturer or formulator makes any warranty of merchantability, fitness of purpose, or otherwise, expressed or implied, concerning the use of a pesticide in accordance with these provisions. The user and/or grower acknowledges the preceding disclaimer and accepts liability for any possible damage resulting from this use. Do not use in mixture with other pesticides unless provided for in the labeling. Trial on a small area to check out unanticipated problems is suggested.

Page 3  
November 6, 1995

24(c) Registrant: California Department of Food & Agriculture  
Pest Detection/Emergency Projects Branch  
1220 N Street, Room A-330  
Sacramento, California 95814  
(916) 654-1211

USEPA SLN No. CA-760221



Jerome R. Campbell  
Supervisor of Registration  
Pesticide Registration Branch  
(916) 324-3889

COUNTY AGRICULTURAL COMMISSIONER'S SIGNATURE \_\_\_\_\_

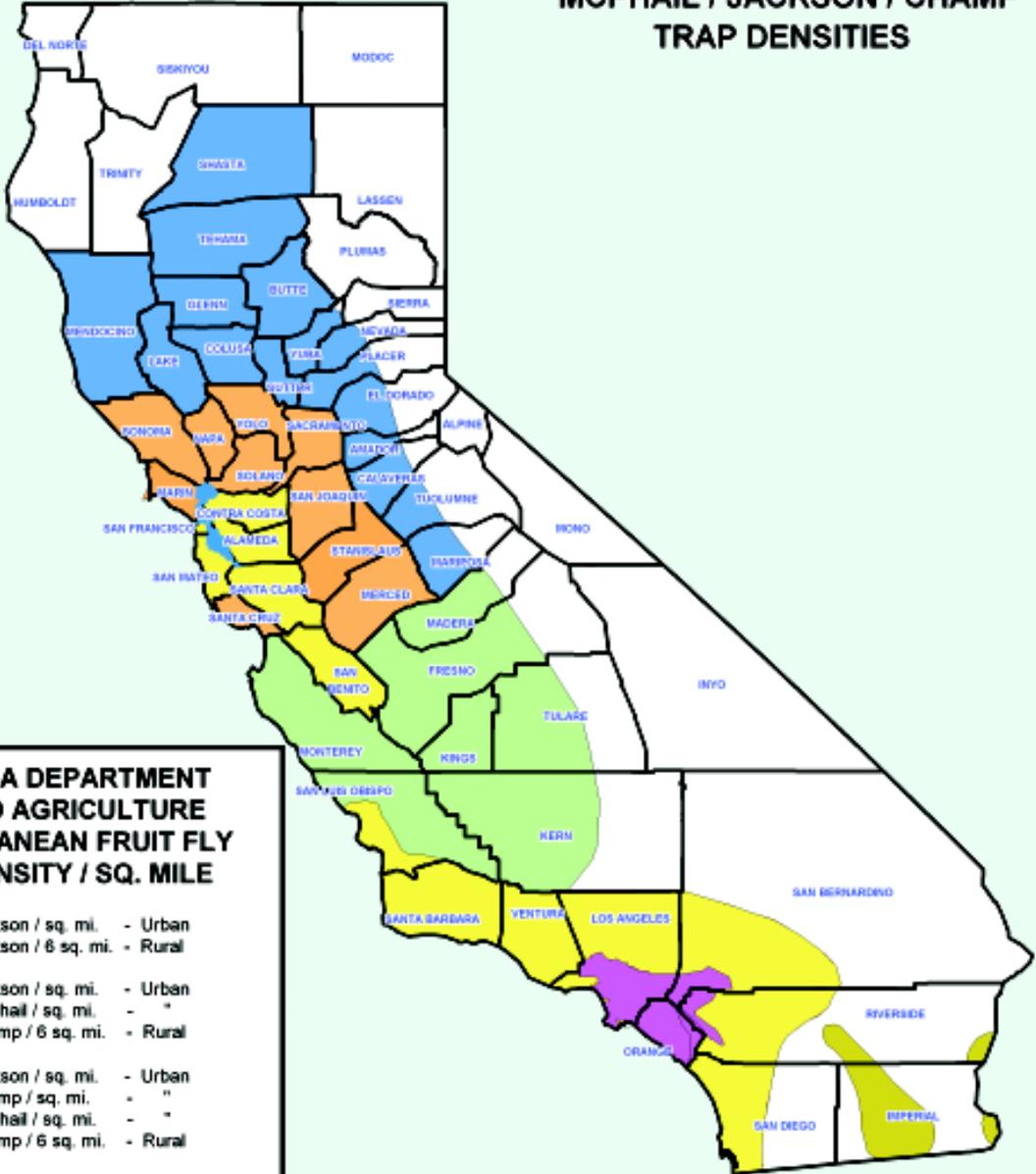
Date \_\_\_\_\_

USER'S SIGNATURE \_\_\_\_\_

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**MEDITERRANEAN FRUIT FLY /  
MCPHAIL / JACKSON / CHAMP  
TRAP DENSITIES**



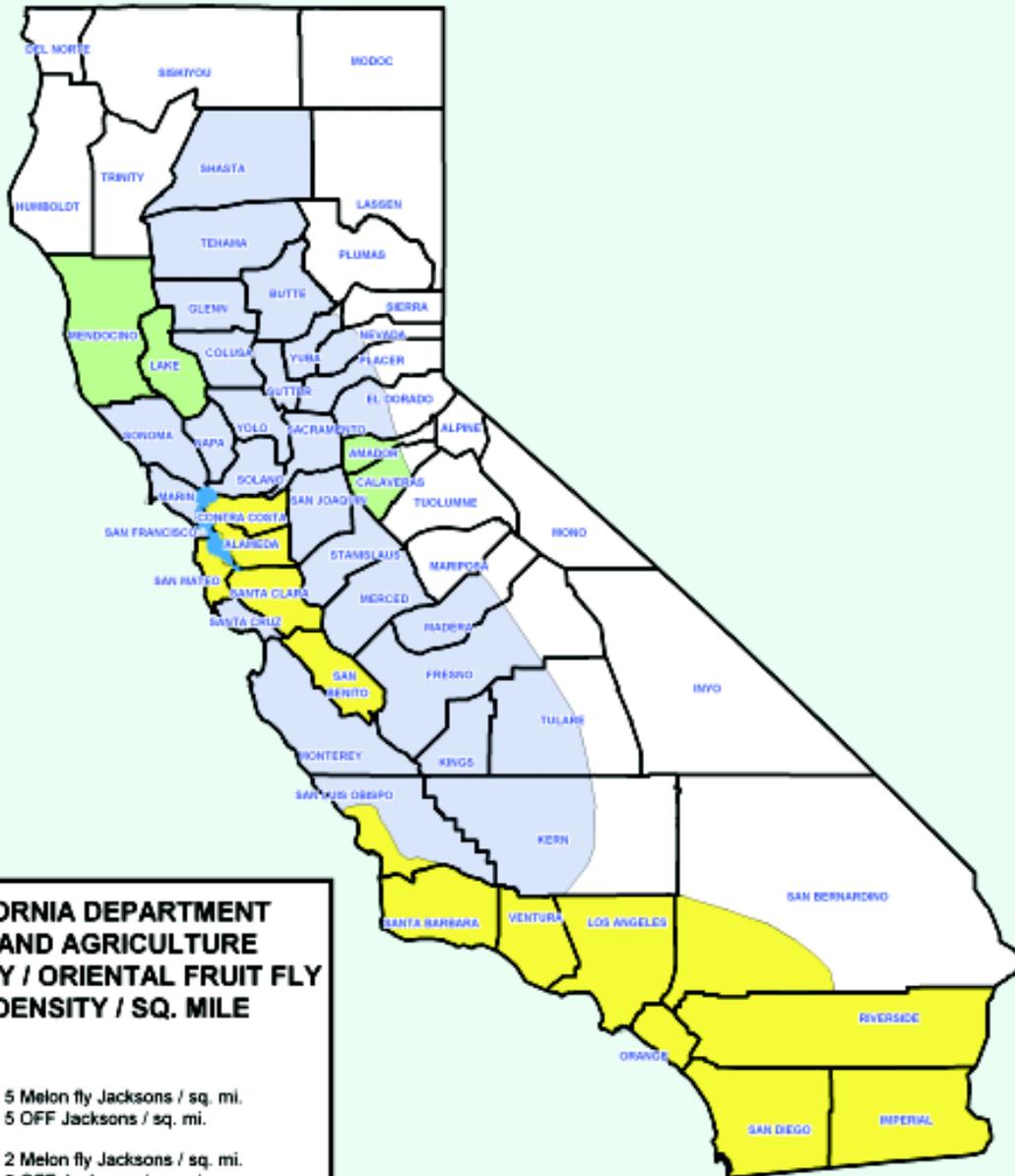
**CALIFORNIA DEPARTMENT  
FOOD AND AGRICULTURE  
MEDITERRANEAN FRUIT FLY  
TRAP DENSITY / SQ. MILE**

	5 Jackson / sq. mi. - Urban 1 Jackson / 6 sq. mi. - Rural
	5 Jackson / sq. mi. - Urban 2 McPhail / sq. mi. - " 1 Champ / 6 sq. mi. - Rural
	5 Jackson / sq. mi. - Urban 2 Champ / sq. mi. - " 3 McPhail / sq. mi. - " 1 Champ / 6 sq. mi. - Rural
	5 Jackson / sq. mi. - Urban 5 McPhail / sq. mi. - " 2 Champ / sq. mi. - " 1 Champ / 6 sq. mi. - Rural
	5 Jackson / sq. mi. 5 McPhail / sq. mi.
	5 Jackson / sq. mi. - Urban 5 McPhail / sq. mi. - " 1 Champ / 6 sq. mi. - Rural
	NO TRAPS



Prepared by John Pozzi, Stephanie Garcia, Gloria Gin

## MELON FLY / ORIENTAL FRUIT FLY TRAP DENSITIES



**CALIFORNIA DEPARTMENT  
FOOD AND AGRICULTURE  
MELON FLY / ORIENTAL FRUIT FLY  
TRAP DENSITY / SQ. MILE**

-  5 Melon fly Jacksons / sq. mi.  
5 OFF Jacksons / sq. mi.
-  2 Melon fly Jacksons / sq. mi.  
2 OFF Jacksons / sq. mi.
-  1 Melon fly Jackson / sq. mi.  
1 OFF Jackson / sq. mi.
-  NO TRAPS



Prepared by John Pozzi, Stephanie Garcia, Gloria Gin





**PROGRAM:** All Purpose Fruit Fly Trapping

**TYPE OF TRAP:** Pherocon AM™ (Adult Monitoring)

The Pherocon AM™ trap (Fig. 1) is a yellow two-sided sticky board with odor attractants incorporated into the stickum. Flies are caught on the sticky capture surface.



**FIGURE 1. PHEROCON AM™ TRAP**

**ATTRACTANTS:** There are two attractant components utilized in the Pherocon AM™ trap (see table below).

Trap Component	Stimulus	Response
Stickum	Ammonium acetate Protein hydrolysate	Feeding
Yellow trap body	Foliar mimic	Feeding and ovipositional

**TRAPPING SEASON:** Subject to host availability, traps are to be deployed beginning May 1, and removed at the last regular servicing prior to October 31.

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Trapping Period												

**TRAP DENSITY:** Detection Survey - Three traps per square mile in urban areas. Selected residences, up to three, in rural residential areas of 300 or more homes per square mile. Trapping to be conducted in those counties as approved in the state/county detection trapping contract.

Delimitation Survey - Within 24 hours of the initial find, place 100 traps in host trees (one trap per tree) in a one-square-mile area surrounding the initial find. If 100 trees cannot be located, use as many as are available.

**INSPECTION FREQUENCY:** Detection Survey - Inspect traps every two weeks.

Delimitation Survey - Inspect traps daily until determined otherwise.

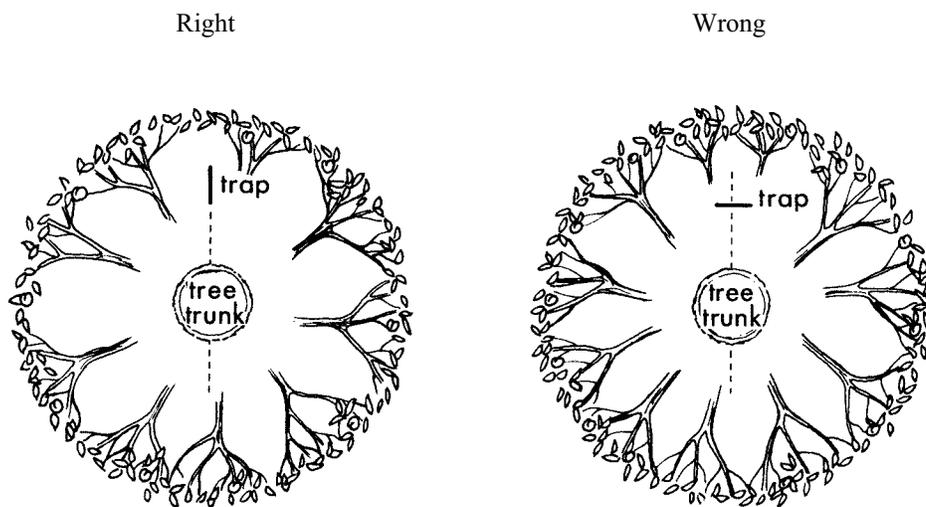
**HOSTS:** The Pherocon AM trap is a general purpose trap for the detection of a wide variety of adult fruit flies. Any type of fruit tree with ripe or nearly ripe fruit can be used. However, traps should not be placed in citrus trees for convenience and maintained on a year-round basis. Relocate traps into different hosts throughout the growing season.

**SELECTION OF TRAPPING SITES:** Selection of a trap site will depend on two main criteria. First and foremost will be a suitable host. Second, it should also meet the conditions for trap placement as described under "Hanging the Trap." Assuming uniform host distribution, then uniform trap distribution should also be achieved. Good host selection should take precedence over trap distribution, within the subdivisions of a square mile. See the section for Medfly trapping under "Trap Density" for a suggested method for subdividing a square mile.

**HANGING THE TRAP:** Traps should be placed in the upper 1/2 to 1/3 of the tree canopy, about two feet from the outer ends of the branches. Maintain a space of 12 inches to 18 inches around the trap; foliage and ripening fruit should surround the trap beyond that distance, particularly to the bottom and sides. Traps should never be hung below the foliage canopy, nor should they be closer than four feet to the ground.

Be sure the trap is visible in filtered sunlight. Direct sun is acceptable as long as the other criteria for placement are met. Use the south (preferable), east or west sides of trees. In extremely hot areas, traps should be rotated to the north side during the hotter months.

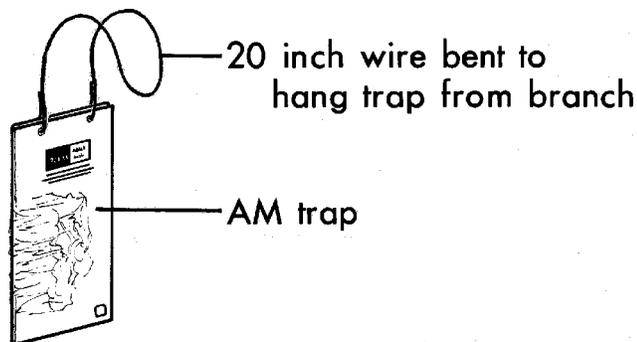
**FIGURE 2. TRAP POSITION WITHIN THE TREE AS SEEN FROM ABOVE**



Position the trap so that a horizontal line parallel to the sticky surfaces intersects the trunk of the tree (Fig. 2). Secure the trap to prevent it from twisting out of position. The best method to use is illustrated in Figure 3. Put a hole in each corner at the top of the trap. Form a loop with a 20-inch piece of wire and attach the two ends to the trap.

Bend the wire as illustrated to hang on a branch. If this method is not practical, then other suggested methods are: (a) hang the trap from a branch with a wire through the center hole in the top of the trap, and secure the trap to a lower branch with a wire through the hole at the lower corner of the trap, or (b) punch a hole in each corner at the top of the trap and use two wires to suspend the trap from a branch. Do not attach any objects to the trap that can move and act as a deterrent.

**FIGURE 3. HANGING SYSTEM FOR AM TRAP**



**TRAP INSPECTION AND SERVICING:** Replace traps every four weeks (sooner if excessively cluttered or dirty). Number and date the trap on the white backside when placing. Service dates can be noted on the yellow edges. Inspect traps carefully as target flies may be easily concealed by other trapped insects and debris. The wings of the target flies may also be folded in the stickum making observation difficult.

**COLLECTION AND SUBMISSION OF SAMPLES:** Traps with suspect flies should be removed and partially folded with sticky surfaces to the inside, and a rubber band placed around the outside to hold position. Use a Standard Form 65-020, "Pest and Damage Record" (PDR), when sending specimens for identification. Be sure specimens are marked "RUSH," both on the identification slip and on the outside of the package. Include the trap number in the "Remarks" section of the PDR Form.

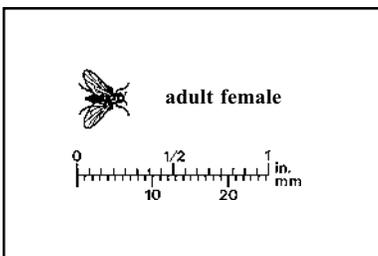
**BAITING INTERVAL:** Replace the entire trap every four weeks. Excessively dirty traps may be replaced every two weeks.

**TRAP RELOCATION:** Relocate as necessary to maintain this trap in a host tree with mature or nearly mature fruit. If a desired fruiting host tree cannot be located, either because of lack of hosts, or lateness of the season, then a trap should not be placed or maintained. This may mean that certain square miles may have fewer traps than the proposed level.





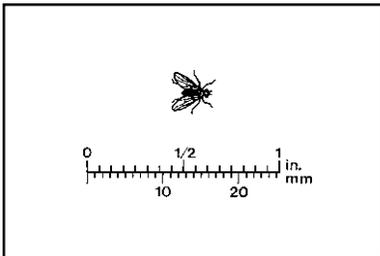
Photo courtesy of Cornell University Agricultural Experiment Station



## APPLE MAGGOT

*Rhagoletis pomonella* (Walsh)





**Western Cherry Fruit Fly**  
*Rhagoletis indifferens* Curran



**PROGRAM:** Boll Weevil Trapping

**TYPE OF TRAP:** Boll Weevil Scout™

The Boll Weevil Scout™ trap (Fig. 1) consists of three parts: the trap body, molded screen cone, and plastic collection chamber. Weevils attracted to the trap enter the collection chamber through the opening at the top of the molded screen cone.



**FIGURE 1. BOLL WEEVIL SCOUT™ TRAP**

**ATTRACTANTS:** 10 mg (3.3%) Grandlure - an artificial aggregation pheromone contained in an orange wafer ("lure tape"), which attracts male as well as female weevils.

Trap Color - the Saturn yellow trap body is an important foliar mimic.

Insecticide - a green wafer containing 10% propoxur (Baygon) is placed with the "lure tape" in the collection chamber. Currently, this wafer is not registered for use in California. Any use of a kill strip or Vapona should be verified for registration.

**TRAPPING SEASON:** From planting date, with full deployment by March 15, through plowdown, no later than December 20.

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Trapping Period												

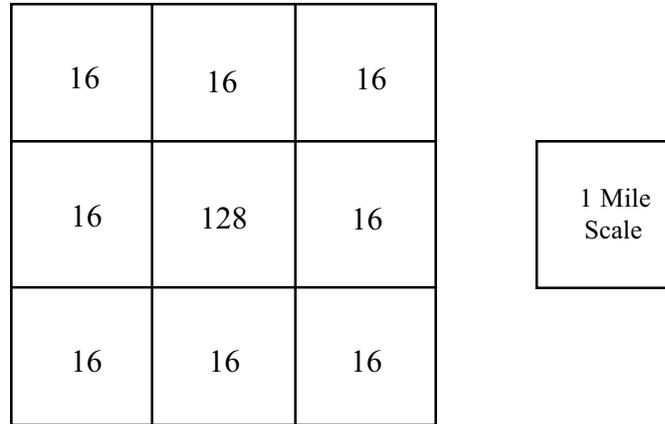
Note: Least likely period for trapping weevils is June through August.

**TRAP DENSITY:**

Detection Survey - Use one trap for every 640 acres of planted cotton. Place additional traps at high-probability locations, i.e., gins, trucking companies, pathways, etc.

Delimitation Survey - Delimitation trapping is conducted following confirmation of a boll weevil collection. Trap density will be increased within 48 hours to one trap per five acres, up to 128 traps in the core square mile. In a one mile buffer surrounding the core mile, traps will be increased to one trap per 40 acres, up to 16 traps per square mile. All traps should be placed around the perimeter of cotton fields, not in the fields.

**BOLL WEEVIL DELIMITATION TRAPPING**



**FIGURE 2.**

**INSPECTION FREQUENCY:** Detection Survey - Traps are to be serviced monthly after plant emergence through plowdown.

Delimitation Survey - Traps in the core square mile will be checked daily during the first week and weekly thereafter. Buffer area traps will be checked as often as determined by project management.

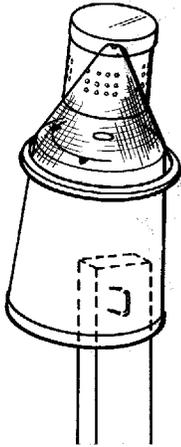
**HOST:** Cotton

**SELECTION OF TRAPPING SITES:** Traps should be placed on the perimeter of a cotton field. The trap works most effectively when it is visible from all directions. Placing the trap close to utility poles, standpipes, and tall weeds will lower the trap's effectiveness. Select trap sites carefully to avoid accidental damage or vandalism. Establish and maintain good geographical distribution. Avoid the tendency to concentrate traps along routes of convenient travel.

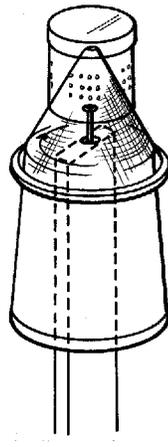
During the winter months, after the cotton has been shredded, the traps may need to be removed or relocated to areas that will provide shelter and moisture for adult beetles. Shelter can be provided by boards, haystacks, weedy ditch banks, brush, etc. This is particularly true for 640 acre parcels.

Early in the spring, as soon as the young cotton plants begin appearing, traps should be moved back to the vicinity of a cotton field.

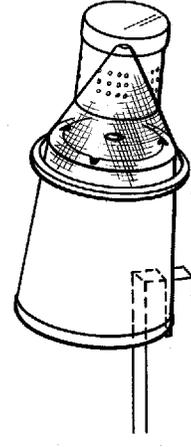
**HANGING THE TRAP:** Traps are to be placed on the top of stakes. They can be stapled on the stake (Fig. 3), set on a nail (Fig. 4), or inserted in a slit cut in the end of the stake (Fig. 5).



**FIGURE 3. STAPLED**

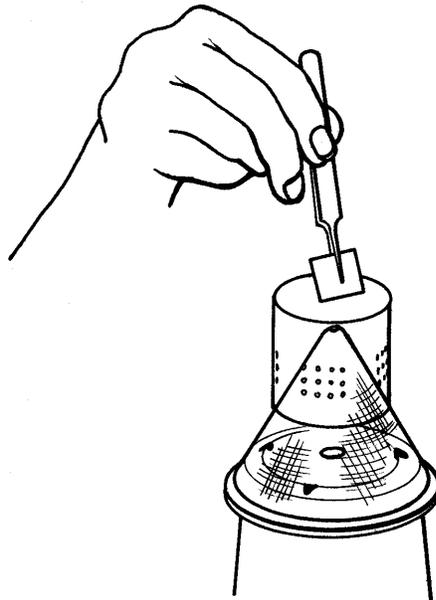


**FIGURE 4. NAILED**



**FIGURE 5. SLOTTED**

Insert one pheromone wafer and one insecticide wafer into the clear collection chamber on the top of the trap (Fig. 6). The Baygon wafer can be attached to the inside of the lid on the collection chamber with an adhesive, i.e., rubber cement. This assures contact with the insecticide since weevils crawl around on the lid after entering the collection chamber. Also, in this location the wafer does not interfere with airflow through the screen cone. Replace the lid. Do not handle the wafers with your fingers, use forceps. Dispose of all used trapping materials at the office, not in the field.



**FIGURE 6.**

**TRAP INSPECTION AND SERVICING:** The stake and the underside of the trap should be inspected before touching the trap. Weevils will often rest on the stake or crawl up on the inside of the trap body. After inspecting the stake, and underside of the trap, proceed with the inspection of the clear plastic collector. The pheromone and insecticide wafers can also conceal weevils. A complete inspection of the trap can be made by removing the plastic lid of the collector and looking under the wafers. When inspecting or baiting the boll weevil trap, the wafers should be handled with forceps. When inspection of the collection chamber is completed, clean out spider webs, etc., and replace the collector lid. Date the trap on the inner surface of the trap body at each inspection. Return the used pheromone wafers to the office for proper disposal.

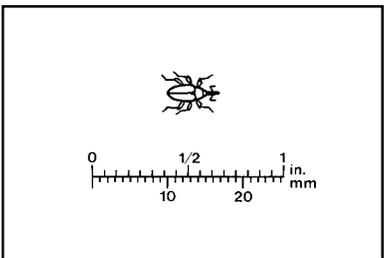
**COLLECTION AND SUBMISSION OF SAMPLES:** DEAD weevils found during the trap inspection are to be placed in a dry vial, using tissue to protect them from damage, and submitted to the Sacramento lab for identification. LIVE weevils should be placed in alcohol and shipped according to instructions listed on page xii. Picking up active weevils from the collection chamber with your fingers is cumbersome and may result in their escape; use forceps. Use a Standard Form 65-020, "Pest and Damage Record" (PDR) when sending specimens for identification. Be sure specimens are marked "RUSH", both on the identification slip, and on the outside of the package. Include the trap number in the "Remarks" section of the PDR Form.

**BAITING INTERVAL:** Change the "lure tape" every month. The insecticide strip is to be replaced about every three months (this may vary depending upon climatic conditions).

**TRAP RELOCATIONS:** A trap can be left at one location as long as the field remains in cotton production. However, at the start of a new growing season, some traps will need to be relocated to accommodate changes in cotton plantings. Vandalism, damage, or missing traps would suggest moving the trap to a different location.



Photo by Jack Clark, University of California Agriculture and Natural Resources



## **BOLL WEEVIL**

*Anthonomus grandis grandis* Boheman



**PROGRAM:** General Fruit Fly Trapping

**TYPE OF TRAP:** ChamP™ Trap

The ChamP™ trap (Fig.1) is a hollow, yellow panel trap with two perforated sticky sides. When folded, the trap is rectangular in shape (7" long, 6" wide), resembling a large tea bag. A food attractant is placed in the center of the trap and is dispersed through the elongate holes in the side panels.



**FIGURE 1. - CHAMP™ TRAP**

**ATTRACTANTS:** Ammonium bicarbonate and yellow color (see table below).

Trap Component	Stimulus	Response
Food packet	Ammonium bicarbonate	Feeding
Yellow trap body	Foliar mimic	Feeding and ovipositional

**TRAPPING SEASON:** Southern California (in part) - Year-round in urban areas of Los Angeles, Orange, San Diego, western Riverside, and western San Bernardino Counties.

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Trapping Period												

Southern San Francisco Bay Area and that part of Southern California not trapping year-round - April through November. Trapping shall commence on April 1 and end on November 30, subject to host availability.

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Trapping Period												

Other Urban Areas - May through October. Trapping shall commence on May 1 and end on October 31, subject to host availability.

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Trapping Period												

Imperial County - November through May. Trapping shall commence on November 1 and end on May 31.

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Trapping Period												

Coachella Valley - September through June. Trapping shall commence on September 1 and end on June 30.

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Trapping Period												

**TRAP DENSITY:** Detection Survey - For the counties using ChamP™ traps in urban areas (see page xxvii), use two traps per square mile in urban areas (the counties of Fresno, Kings, San Joaquin, and Santa Cruz will use some ChamP™ traps in lieu of a McPhail trap in some rural residential areas). Use one trap per six square miles in rural areas.

Delimitation Survey - See Delimitation Survey sections for the appropriate fruit fly.

**INSPECTION FREQUENCY:** Detection Survey - Once every 14 days for urban trapping and once per month for rural trapping.

Delimitation Survey - See Inspection Frequency for the appropriate fruit fly.

**HOSTS:** The selection of the best host at each trap location is the most important phase of an effective detection program. Priority must be given to hosts listed in the Host Preference List.

### General Fruit Fly Host Preference List

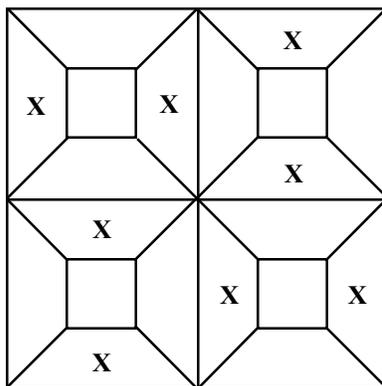
Primary hosts are vegetables; fruit trees are secondary hosts.

Cucurbits (melons, squashes, cucumbers, pumpkins, gourds, etc.)  
Tomatoes  
Green beans  
Peppers  
Okra  
Eggplant  
Stone fruits  
Pome fruits  
Tropical fruits  
Citrus

For all *Anastrepha* spp., *Bactrocera* spp., and *Dacus* spp. and fruit flies in general, fruit trees are acceptable for trapping when none of the above vegetable hosts are available.

**SELECTION OF TRAPPING SITES:** The two ChamP™ traps per square mile deployed for general fruit fly detection must be placed near primary hosts in the general fruit fly host preference list. ChamP™ traps deployed in or near gardens for general fruit fly detection can utilize non-fruit trees to keep the trap as close as possible to the garden.

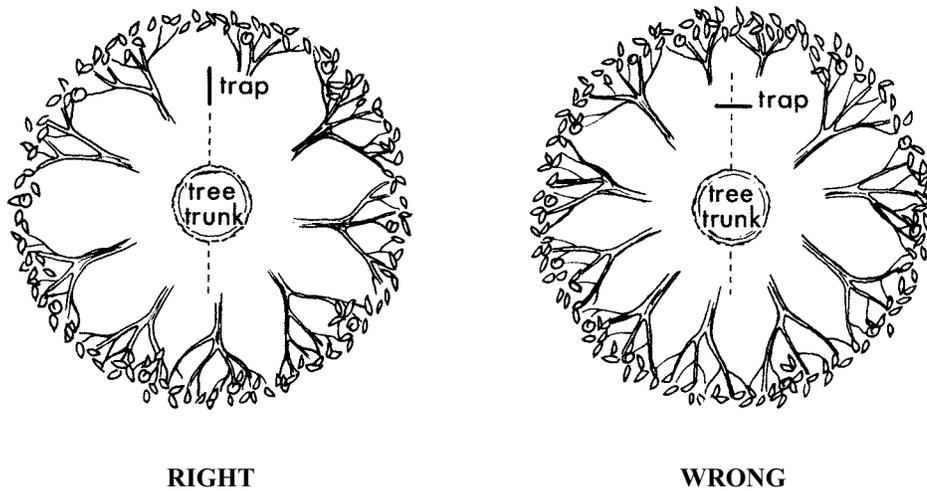
Maintain a uniform trap distribution. This can be achieved by alternating trap placement from the north/south subgrids in one mile to the east/west subgrid in the adjoining mile. Repeat this pattern over the entire trapping area (Fig. 2). However, host availability will always determine trap location.



**FIGURE 2.**

**HANGING THE TRAP:** Traps should be placed in the upper 1/2 to 1/3 of the tree canopy, about two feet from the outer ends of the branches. Maintain a space of 12 inches to 18 inches around the trap; foliage and ripening fruit should surround the trap beyond that distance, particularly to the bottom and sides. Traps should never be hung below the foliage canopy, nor should they be closer than four feet to the ground.

Be sure the trap is visible in filtered sunlight. Direct sun is acceptable as long as the other criteria for placement are met. Use the south (preferable), east or west sides of trees. In extremely hot areas, traps should be rotated to the north side during the hotter months. Position the trap so that a horizontal line parallel to the sticky surfaces intersects the trunk of the tree (Fig. 3).



**FIGURE 3 - TRAP POSITION WITHIN THE TREE AS SEEN FROM ABOVE**

**TRAP INSPECTION AND SERVICING:** Replace the ChamP™ trap every six weeks or more frequently if the sticky surfaces are excessively dirty. Write the trap number and deployment date on the top fold at the time of deployment. Also, date each lure packet when first placed in the field. Inspect traps carefully as target flies may be easily concealed by other trapped insects and debris or may be difficult to recognize because distinguishing features such as wing patterns and body coloration may be obscured by the adhesive. Since the ChamP™ trap is equivalent to a Jackson trap insert, it must be replaced whenever the trap is relocated. The food bait packet is designed to last five months.

**COLLECTION AND SUBMISSION OF SAMPLES:** When collecting samples for identification, the following steps should be taken:

1. Pull open the tear strip along the folded flap at the top of the trap. Remove the trap hanger and the attractant. Invert the trap so that the sticky sides are facing inward, but not touching. Refold the top flap and hold it in place with a paper clip or rubber band. This will secure the trap in an inside-out position and prevent damage to any insects caught in the adhesive.
2. Place the trap in a #4 paper bag or zip shut plastic bag. Staple or include the Standard Form 65-020, "Pest and Damage Record" (PDR) or equivalent "Project Submission Form" to the outside of the bag. Specimens submitted to Sacramento may be cut from the sticky insert and placed in a dry vial for submission. Be sure the identification slip and the outside of the package are marked "Rush." Include the trap number in the "Remarks" section of the PDR Form.

**BAITING INTERVAL:** Replace the trap a minimum of once every six weeks. The food lure packet is designed to last up to five months.

**TRAP RELOCATION:** Relocate every six weeks to a new site at least 500 feet away. When relocation sites are limited, traps can remain longer than six weeks as long as fruit is available at the trap site. Relocations should provide for moving the trap throughout its assigned area during the course of the trapping season.

ChamP™ traps deployed at garden sites with melon fly traps will relocate on the melon fly trap relocation schedule. Prior to the deployment of and subsequent to the removal of melon fly traps, these traps will be relocated on a six-week schedule. When the season for garden host plants has past these traps are to be deployed in fruit trees with fruit.



**PROGRAM:** European Corn Borer (ECB) Trapping

**TYPE OF TRAP:** Pherocon 1C™

The Pherocon 1C™ trap (Fig. 1) is a cardboard trap with a non-sticky top and replaceable bottom coated with stickum. A rubber cap impregnated with ECB pheromone attracts male moths onto the sticky capture surface.



**FIGURE 1. PHEROCON 1C™ TRAP**

**ATTRACTANT:** A synthetic sex pheromone, 97% (Z)-11-tetradecenyl acetate and 3% (E)-11-tetradecenyl acetate.

**TRAPPING SEASON:** Traps are to be deployed prior to April 1 and removed after September 30.

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Trapping Period												

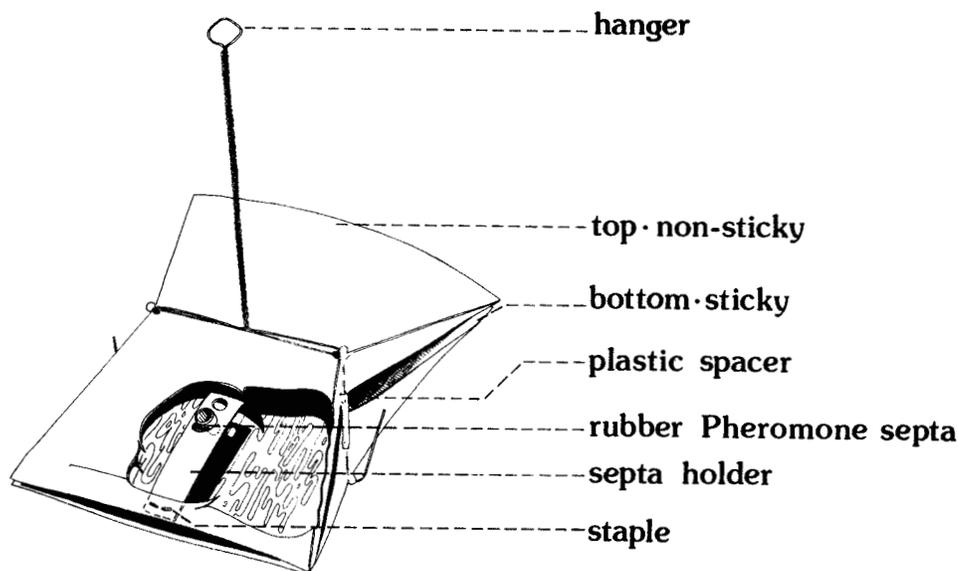
**TRAP DENSITY:** Use one trap per high-hazard location, i.e., mills or feed lots receiving grain from ECB infested areas. (Infested areas of the U.S. are generally east of the Rocky Mountains.) For larger facilities, use two or more traps located on opposite sides of the facility. Extra traps can be used in high density urban areas.

**INSPECTION FREQUENCY:** Traps are to be inspected every two weeks. Inspect at least weekly for delimitation or intensive survey.

**HOSTS:** ECB is primarily considered a pest of corn. However, it is known to attack nearly every herbaceous plant large enough for the larvae to enter. Commonly reported hosts include: corn, dahlia, barnyard grass, pigweed, ragweed, chrysanthemum, gladiolus, potato, oat, green bean, rhubarb, hemp, lambsquarter, and Johnsongrass.

**SELECTION OF TRAPPING SITES:** See "Trap Density."

**HANGING THE TRAP:** Assemble the trap as per Zoecon instruction sheet (pg. ECB-3). **Do not** use your fingers to insert the rubber pheromone cap. Pheromone caps should be placed in the plastic friction holder, and the holder stapled to the inner surface of trap top (Fig. 1). Hang the trap from a metal rod about two to three feet above the ground. Traps should be located near host plant areas upwind of the high-hazard facility. Keep away from high dust areas.



**FIGURE 2. PHEROCON 1C™ TRAP DIAGRAM**

**TRAP INSPECTION AND SERVICING:** Change the trap bottom every two weeks or sooner depending on the amount of accumulated debris. The trap top can be changed as needed. Trap identification and dates should be located on the underside of the sticky bottom. When removing old pheromone caps and trap bottoms, return them to the office for proper disposal. Do not dispose of old trapping materials at any location other than the office.

**COLLECTION AND SUBMISSION OF SAMPLES:** When a suspect specimen is detected, the entire sticky bottom should be removed, carefully folded so as not to damage the specimen, and sent to Sacramento with a Standard Form 65-020, "Pest and Damage Record" (PDR). Be sure specimens are marked "RUSH," both on the identification slip and on the outside of the package. Include the trap number in the "Remarks" section of the PDR Form.

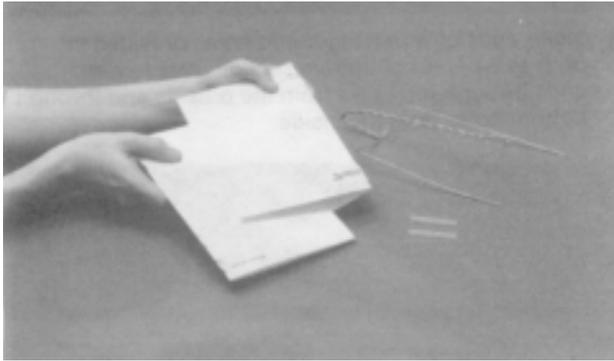
**BAITING INTERVAL:** Change the pheromone cap every two weeks.

**TRAP RELOCATION:** No relocation is normally required. However, facilities that change operations or new facilities will require adjustments in trap deployment.

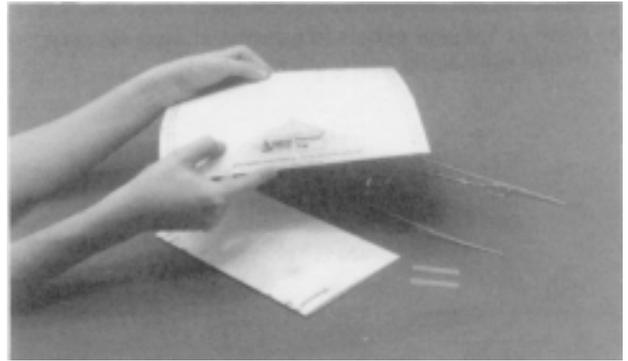


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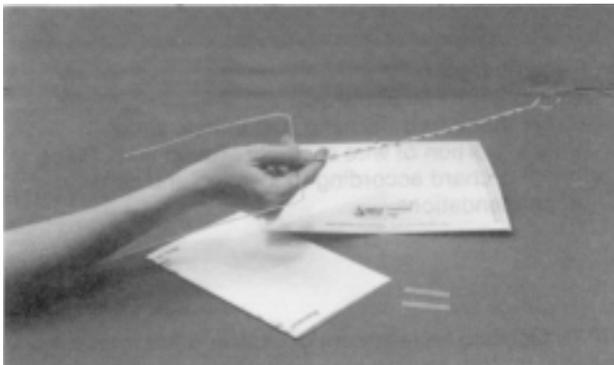
## Instructions for Assembling Pherocon®1C Traps



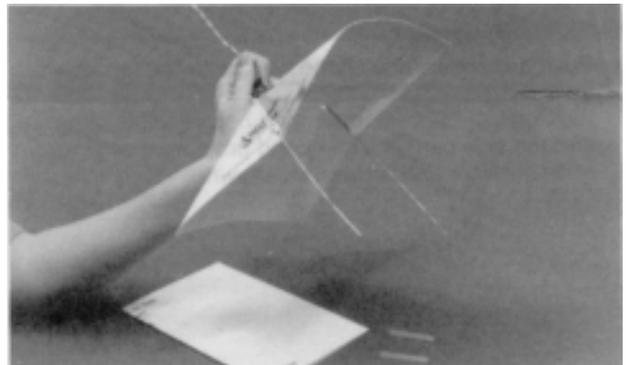
1. Remove one folded trap top, one folded trap bottom, (with sticky inside surface) two spacers and one wire hanger from shipping container.



2. Open top section and push down on side panels to position shown. Be sure to fold only along score marks provided.



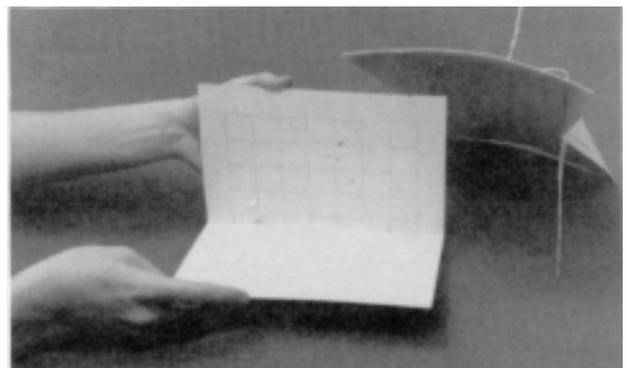
3. Straighten wire hanger to shape shown.



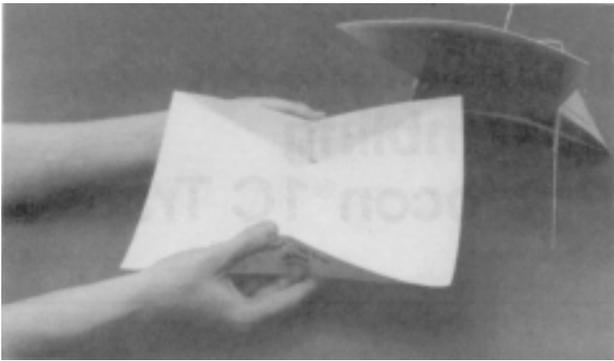
4. Insert ends of wire hanger into holes provided in side panels of top section. Weave wire ends through top holes from the outside and through bottom holes from the inside. With wire ends inserted in holes, push wire hanger down as far as it will go.



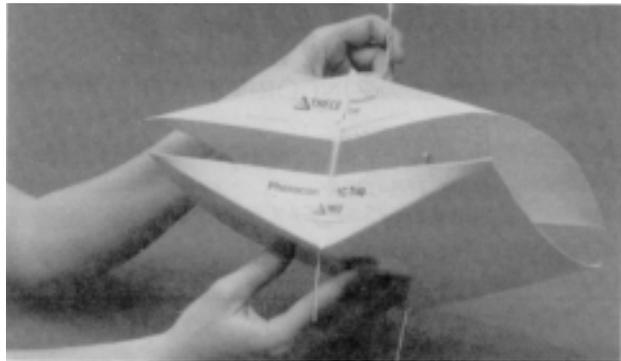
5. Slide one spacer on each of the wire ends. Push them up all the way to the bottom hole so that the ends of the spacers are caught and held between the wires and the side panels.



6. Open folded bottom section as shown to expose grid and sticky surface.



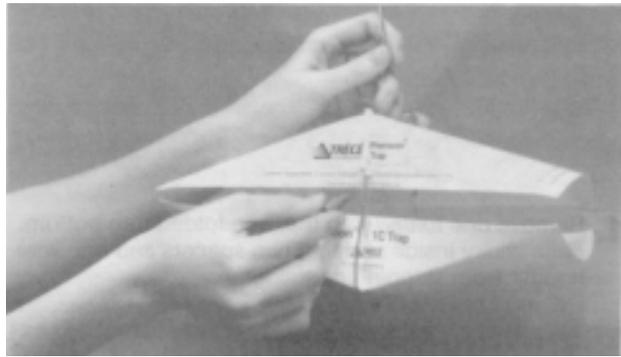
7. Push up on side panels to position shown. Be sure to fold only along score marks provided.



8. Insert ends of wire hanger into holes provided in both side panels of bottom section. Weave wire ends through top holes from the outside and through bottom holes from the inside.



9. Push bottom section all the way up to the top hole so that the ends of the spacers are in line with the top holes of the bottom section between the wires and the side panels. Then bend projecting wire ends outward and upward as shown.

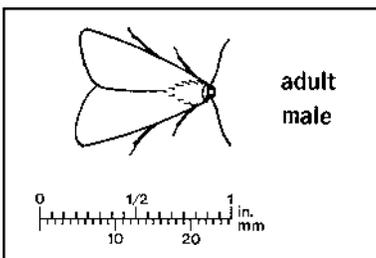


10. Place Pherocon Cap directly on sticky surface by dropping it through the side opening and into the center of the trap. To hang trap in tree, wrap braided portion of wire securely around limb. Place trap in orchard according to location and density recommendations.

**Note:** To facilitate replacement of caps and the removal of insects, bottom section may be lowered on one side by straightening the wire end on that side. Be sure to return bottom section, spacer and wire end to their original positions.



Photo courtesy Marlin E. Rice



## European Corn Borer

*Ostrinia nubilalis* (Hübner)



**PROGRAM:** European Pine Shoot Moth (EPSM) Trapping

**TYPE OF TRAP:** Pherocon II™

The Pherocon II™ trap (Fig. 1) is a tent-like cardboard trap with all inside surfaces coated with stickum. A rubber cap impregnated with EPSM pheromone attracts male moths onto the sticky capture surface.



**FIGURE 1. PHEROCON II™ TRAP**

**ATTRACTANT:** A synthetic sex pheromone.

**TRAPPING SEASON:** Traps should be placed after May 1 and be removed prior to July 31. (For higher elevations, and the cooler northern coastal areas, flight most likely will not occur until late June or early July.) There is one generation a year.

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Trapping Period												

**TRAP DENSITY:** In California, only sites of some introductory risk are being trapped at this time. These sites are generally nurseries where living trees may be introduced from infested areas of the United States. Use one trap per site, or one trap per four acres.

**INSPECTION FREQUENCY:** Inspect traps once every two weeks for detection. Inspect at least weekly for delimitation or intensive survey.

**HOSTS:** Many species of pine are attacked, some of which are Scotch pine, Austrian pine, mugho pine, red pine, lodgepole pine, and ponderosa pine. For detection purposes, any pine in an area at risk for EPSM should be considered a potential host.

**SELECTION OF TRAPPING SITES:** See "Trap Density."

**HANGING THE TRAP:** Traps are most effective if placed in host trees. Traps should be placed five to seven feet above the ground on the outer periphery of the pine foliage. Do not hide traps beneath the branches. If host plants are small and fragile, place the trap on a stake or some other support, but always touching or directly adjacent to host plant foliage. **DO NOT** use your fingers to insert rubber pheromone caps. Pheromone caps should be placed in the plastic friction holder and the holder stapled to the inner surface of the trap top.

**TRAP INSPECTION AND SERVICING:** Remove the trap from the host tree. Open both ends of the trap to observe trapped specimens. If there are no suspicious specimens, close the ends and return the trap to the host tree. If the trap body deteriorates, replace it and use the old pheromone cap. Do not handle the pheromone cap with your fingers; use forceps. Do not dispose of old trap materials in the field. Return them to the office for disposal.

**COLLECTION AND SUBMISSION OF SAMPLES:** Suspect specimens should be kept in the trap and sent in a plastic bag to Sacramento. Use Standard Form 65-020, "Pest and Damage Record" (PDR). Be sure specimens are marked "RUSH," both on the identification slip and on the outside of the package. Include the trap number in the "Remarks" section of the PDR Form.

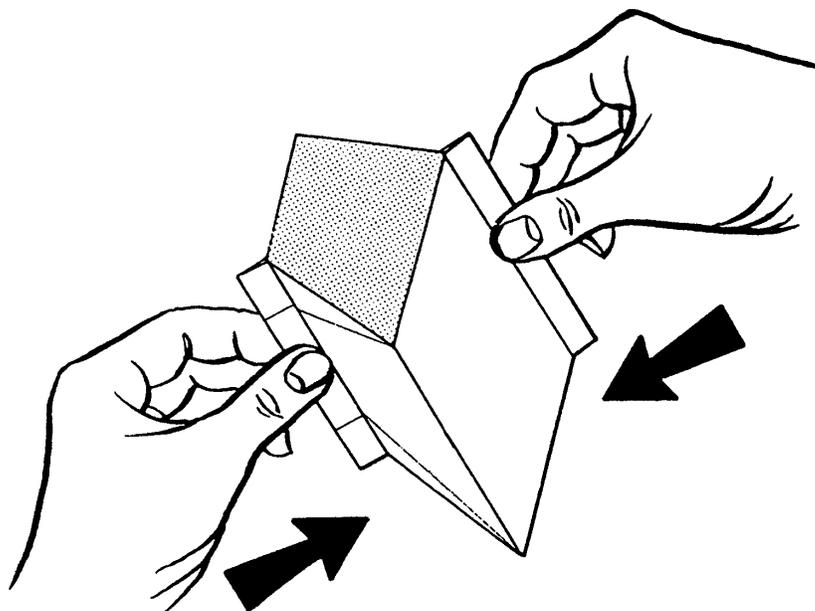
**BAITING INTERVAL:** The pheromone cap is good for six weeks.

**TRAP RELOCATION:** No relocation is necessary.

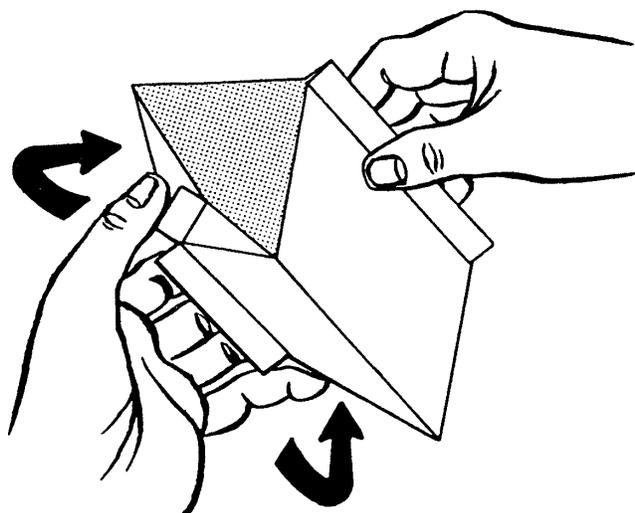


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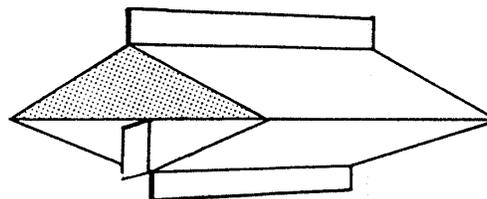
# Instructions for Assembling Pherocon® II Traps



Hold trap at top with one hand, and grasp bottom with other hand and pull apart.



Tuck side panels inward along creases.



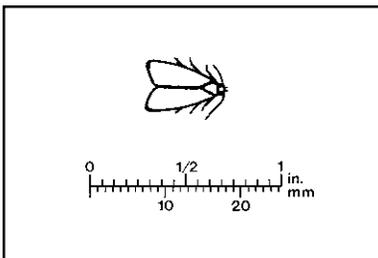
Finished trap.

Storgard and Pherocon are registered trademarks of SANDOZ LTD., Basel, Switzerland





Photo courtesy of Gary Daterman, USDA - Forest Service



**European Pine Shoot Moth**  
*Rhyacionia buoliana* (Schiffermüller)



**PROGRAM:** Gypsy Moth Trapping

**TYPE OF TRAP:** Gypsy Moth Delta Trap

The gypsy moth delta trap (Fig. 1) has three sides. Two interior surfaces are coated with stickum, and the third has the pheromone strip attached to it. Male moths enter through the triangular opening at either end of the trap and are captured on the sticky surfaces.



**FIGURE 1. GYPSY MOTH DELTA TRAP**

**ATTRACTANT:** (+) enantiomer of disparlure - a synthetic sex pheromone contained in a laminated plastic strip.

**TRAPPING SEASON:** Traps may be placed prior to June 1, with the first servicing planned after June 15, and removed at the last regular servicing after September 1. (At higher elevations or in cooler climates, trap placement may be delayed, depending on accessibility. In these instances, trap removal should be delayed until the traps have been deployed for the necessary three month period.)

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Trapping Period												

**TRAP DENSITY:** Detection Survey - Coastal counties - Use three traps per square mile in urban areas and rural residential areas of 300 or more homes per square mile.

Other counties - Use two traps per square mile in urban areas and rural residential areas of 300 or more homes per square mile.

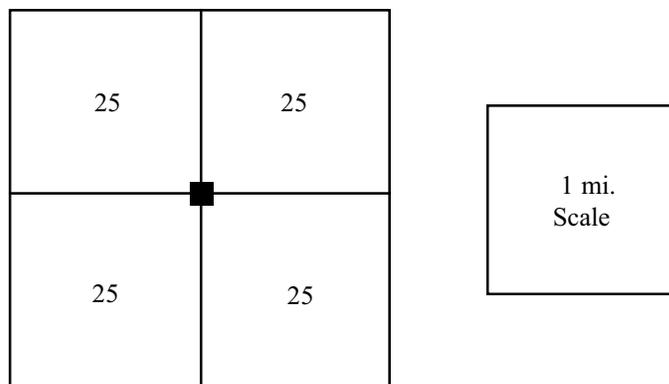
High-hazard sites (for all counties) - Use a minimum of one trap per site. High-hazard sites include campgrounds, recreational areas, mobile home and RV parks, state parks, federal parks and monuments, properties of recent immigrants from gypsy moth infested areas, moving companies, etc.

Asian gypsy moth trapping - Seaport locations identified as high risk for Asian gypsy moth should be trapped at 10 traps per square mile over four square miles, using the port site as the epicenter.

For remote areas or Asian gypsy moth trapping, where only gypsy moth traps are in use, half-sheet trap cards (Form 60-206) may be used (see page xix).

Delimitation Survey - When a gypsy moth is trapped, trap densities will be increased within 48 hours to 25 traps per square mile over four square miles surrounding the find, using the original find as the epicenter (Fig. 2). Half-sheet trap cards (Form 60-206) may be used for this purpose.

### GYPSY MOTH DELIMITATION SURVEY



**FIGURE 2.**

If the moth is captured in a trap near or at the site of a quarantine inspection find (resulting from the movement of household goods from an infested state), and no other moths have been trapped nearby, a single square mile around the catch will be trapped using 25 traps.

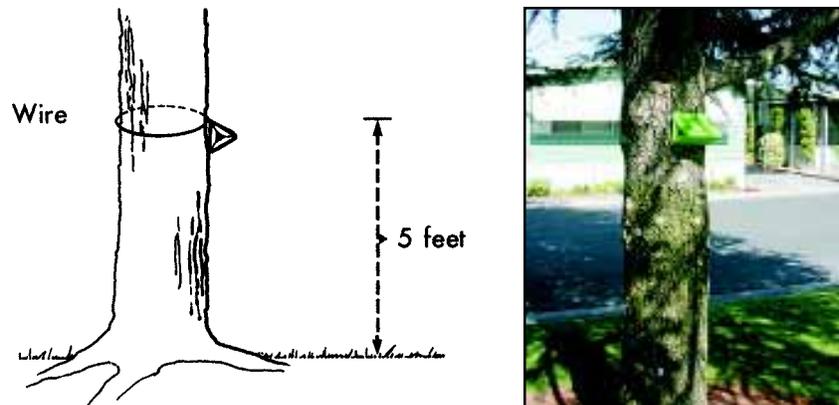
Additional moth finds may necessitate additional trap deployment.

**INSPECTION FREQUENCY:** Inspect every two weeks for detection. For delimitation or intensive survey, inspect daily until determined otherwise.

**HOSTS:** Larvae feed on trees and shrubs. For trapping adult male moths, a specific host tree is not necessary.

**SELECTION OF TRAPPING SITES:** Maintain a uniform distribution. The placement of traps on urban properties and high-hazard sites is a priority. Gypsy moths are most likely introduced on household effects. Due to the dispersal of the pheromone through the wind and air currents, traps should not be placed in close proximity to fences, brick walls, houses or other breeze-sheltered areas. Male moths usually follow the edges of woodlands. They do not frequent large, open areas without trees or shrubs. Avoid areas where children play frequently, areas soaked by sprinklers, and areas used by barnyard animals. If public areas are utilized, select areas where vandalism is minimized.

**HANGING THE TRAP:** One method is to affix the trap four to five feet off the ground with a loop of wire around a selected tree with a diameter of 12 to 24 inches (Fig. 3). Another alternative is to use a staple to secure the trap to the tree trunk. To staple, open the trap and staple to the tree from the inside top of the trap. This allows the trap to remain stapled to the tree when the trap is opened for inspection by removing the two paper clips. Smaller or larger diameter trees can be used when the preferred size is unavailable. Choose a tree where the trap will take advantage of air currents to disperse the lure. Use the sunny (usually south) side of the tree. Snails and earwigs may crawl up the trunk and congregate on the inside of the traps. If this is a problem, move the trap. If a possibility of vandalism exists, the traps can be moved higher up the trunk or to the back side, out of view. Do not block trap entrances with foliage and other obstacles. Be sure the trap opening conforms neatly along the perforation so that a standard triangular opening is maintained. Do not wrap wire tightly as tree girdling can occur over the trapping season.



**FIGURE 3. STANDARD METHOD FOR HANGING A GM TRAP**

**TRAP INSPECTION AND SERVICING:** Observe the inside sticky areas by opening the trap and reclosing when finished, or look through both ends of the trap. Moths are commonly caught under the lower lip of the trap entrance and can be overlooked. The pheromone and trap body will last all season. Traps that were not used should be discarded at season's end. Additionally, it is important to ensure that all traps are removed from the field at the end of the trapping season. If left in the field, they may attract moths. Since old traps will not be inspected, trapped moths will go undetected. Research indicates that the lure will continue to attract some moths even after nine months of exposure.

**COLLECTION AND SUBMISSION OF SAMPLES:** Suspect specimens should be kept in the trap and submitted in a plastic bag. Use Standard Form 65-020, "Pest and Damage Record" (PDR). Be sure specimens are marked "RUSH," both on the identification slip and on the outside of the package. When removing a trap for a moth identification, be sure to hang a replacement trap in its place. Include the trap number in the "Remarks" section of the PDR Form.

**BAITING INTERVAL:** The trap and pheromone are good for the entire season unless they physically deteriorate due to water, dust, etc. TO PREVENT CONTAMINATION OF OTHER SURFACES, **DO NOT TOUCH THE PHEROMONE STRIP.**

**TRAP RELOCATION:** Once the trap is suitably placed and a uniform grid pattern is established, trap relocation is not necessary. Vandalism or missing traps would suggest placing the trap in a different location.

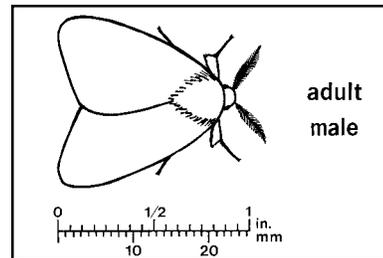




USDA APHIS PPQ Archives. Image 26520796. ForestryImages.org. <http://www.forestryimages.org/>. December 24, 2001.



Photo by Ray Bingham, California Department of Food and Agriculture



**GYPSY MOTH**  
*Lymantria dispar* (Linnaeus)



**PROGRAM:** Mediterranean Fruit Fly (Medfly) Trapping

**TYPE OF TRAP:** International Pheromone McPhail Trap (IPMT)

The International Pheromone McPhail Trap is a plastic trap consisting of four major parts: Top (clear plastic), bottom (yellow plastic), hanger (non-rusting wire), and lures (three component lure pack) (Fig. 1). This trap can be used wet or dry and provides for various lure combinations. When used wet, flies enter from the opening at the bottom of the trap and drown in a liquid solution.



**FIGURE 1. INTERNATIONAL PHEROMONE MCPHAIL TRAP**

**ATTRACTANTS:** Putrescine (FFP), Ammonium acetate (FFA), and Trimethylamine (FFT). All three attractants are synthetic food lures that attract male and female flies. Lures are shipped in sealed packages and should not be opened until the trap is deployed.

Trap Component	Stimulus	Response
Small Lure Patch	Putrescine (FFP)	Feeding
Large Lure Patch	Ammonium acetate (FFA)	Feeding
Large Lure Patch	Trimethylamine (FFT)	Feeding

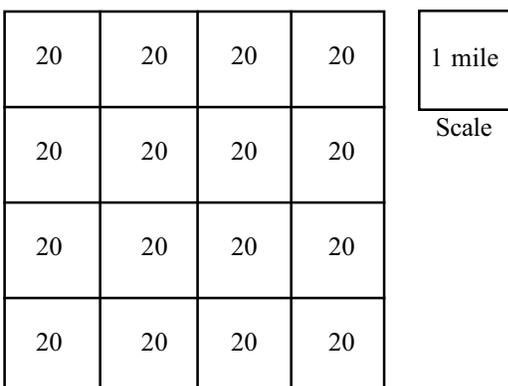
The cylindrical shape of the trap mimics the three dimensions of the host fruit and is also an important aspect of the trap's effectiveness.

**TRAPPING SEASON:** Determined by project management.

**TRAP DENSITY:** At this time, IPMT traps are primarily used for detection within a sterile release area of a preventative release program (PRP). Recommended trap densities are determined by project management. An example of trap densities within a medfly sterile release area is as follows (Fig. 2).

**MEDFLY DELIMITATION  
TRAPS PER SQUARE MILE**

**IPMT TRAP TOTALS**



16 square miles @ 20 traps per square mile.

Total: 320 traps

**FIGURE 2.**

Within the sterile release area, the Jackson traps are removed from a sixteen square mile core (when only a single fly is trapped a four square mile core may be used). The standard glass McPhail traps, if needed for detection of other fruit fly species, will remain in use throughout the core area.

**INSPECTION FREQUENCY:** Traps are serviced weekly in a sterile release program.

**HOSTS:** See host preference lists in those sections that are species specific.

**SELECTION OF TRAPPING SITE:** Selection of a trap site will depend on two main criteria: a suitable host tree and uniform trap distribution throughout the assigned area. At a density of twenty traps per square mile, every effort should be made to maintain an even distribution of traps while also utilizing the best hosts within the sphere of influence of the trap. A suitable host can be defined as one of the listed host plants with foliage and nearly mature fruit, and one that is suitable for trap placement as described under "Hanging The Trap". However, shade and shelter, particularly in hot weather, also influence host selection by fruit flies. Thus, a densely foliated host tree without fruit may be preferable to a fruiting, sparsely foliated host tree. However, a well foliated, fruiting host tree will always be the tree of first choice.

**Special Considerations In A Preventative Release Program:** At a trap density of twenty traps per square mile, some areas may at times have a limited number of host trees with fruit. When this occurs, consideration should be given to placing the trap in a host tree with foliage and evidence of **abundant honeydew**. Honeydew is a sweetish, clear excretion produced by certain insects such as aphids, scale insects, mealybugs, and whiteflies. When present it usually accumulates on the foliage and is a good food source for adult fruit flies. The presence of black sooty mold on the foliage is an indication that the honeydew is present.

**HANGING THE TRAP:** When installing the IPMT trap it is necessary to attach the self-adhesive lure patches to the **inside** surface of the top portion of the trap. First remove the back side cover from the adhesive, then remove the protective cover from the front side and use it to press the lure patch against the trap. There are three different patches identified by a **last** letter, FFP, FFA, and FFT. The FFA and FFT patches are identical; therefore, it is necessary to mark the corner of each lure patch with its identifying letter e.g. A, P, and T. This is necessary in case one of the patches falls off and needs to be replaced.

Looking down on the trap from the top, place the putrescine (FFP) first. Moving clockwise, attach the ammonium acetate (FFA) and then the trimethylamine (FFT) patches on opposite sides of the inside surface of the top of the trap. **Immediately place the protective covers in a plastic bag for disposal at headquarters.**



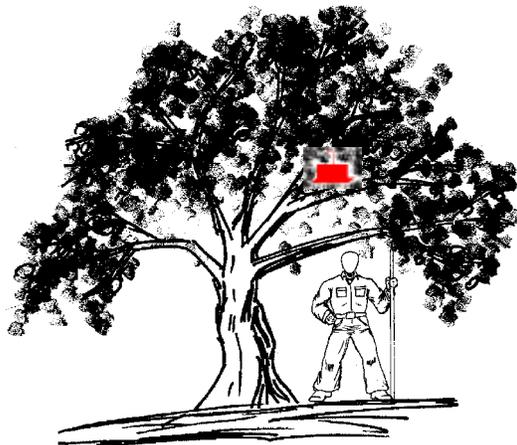
**FIGURE 3.**



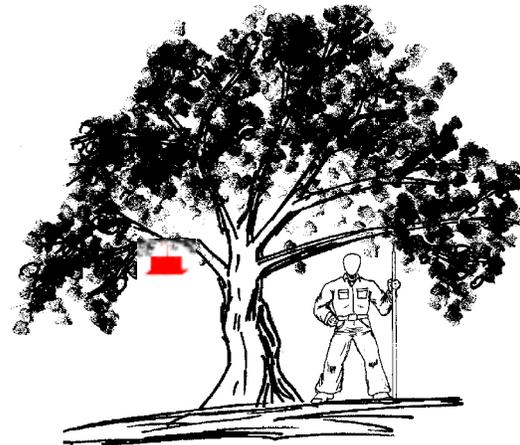
**FIGURE 4.**

The IPMT traps at this time, are used wet (with a liquid solution inside). The recommended trapping solution is a dilute mixture of propylene glycol (PG), Prestone Lo-Tox Antifreeze. Prepare the solution in advance by adding 1 ounce PG to 15 ounces of water in a standard 16 ounce plastic bottle. Place this amount of solution in the trap bottom. The trap top and bottom can now be attached.

Place the trap in the warmest part of the tree in open shade (**not in full sunlight at any time**). During extremely hot weather, traps may need to be moved to other areas of the tree. Traps should be placed in the upper 1/2 to 1/3 of the tree canopy on a strong branch, 1/2 to 1/3 the distance from the trunk to the outer edge of the foliage. Lower levels are acceptable only if it is impossible to find a desired spot higher in the tree. Before placing a trap at lower levels in a tree, safety to children and the security of the trap must be considered. It should not be placed in dense foliage that may block the trap entrance or give the fly a resting place that would prevent it from entering the trap.



**CORRECT  
PROPER HEIGHT**



**INCORRECT  
PLACED TOO LOW**

**FIGURE 5.**

Maintain a foliage-free space of 12 to 18 inches around the trap, but be sure foliage and ripening fruit surround the trap beyond that distance, particularly to the bottom and sides. Traps should never be hung below the foliage canopy, nor should they be closer than four feet to the ground (Fig. 5).

**TRAP INSPECTION AND SERVICING:** Remove the trap from the tree. Check to determine if live flies are present clinging to the inside surface of the top of the trap, behind the lure patches, or in the air space within the trap. If so, try to tap the top of the trap and knock the flies down into the solution or seal the bottom entrance with your hand and gently swirl the liquid to immobilize any specimens being careful not to wet the lure patches. Avoid spilling the PG solution. Remove the top of the trap and pour the solution through a straining pan such that the PG solution can be collected in a second pan for reuse. The PG solution may then be poured into a 16 ounce bottle for recharging another trap. If the PG solution is not suitable for reuse in the trap, it should be collected and taken to an auto service center for appropriate disposal.

The pan with the trapped specimens is floated in a pan of clear water. Softened and rolled wings, even if detached from fly bodies, will straighten out and readily be seen on the surface of the water. Once the fly contents of the trap have been properly reviewed the trap is ready for re-deployment. Keep the inside and outside of the plastic trap clean. This should be done on a weekly basis with a dry rag. The trap should be washed in water at each re-baiting (four weeks).

**COLLECTION AND SUBMISSION OF SAMPLES:** In the sterile release area of the Preventative Release Program, the captured target insects from any one trap are all placed in the same alcohol vial for submission to the laboratory. Only one identification slip is required per trap. Use a Standard Form 65-020, "Pest and Damage Record" (PDR). Include the trap number in the "Remarks" section of the PDR Form.

**BAITING INTERVAL:** Lure patches should be replaced every four weeks.

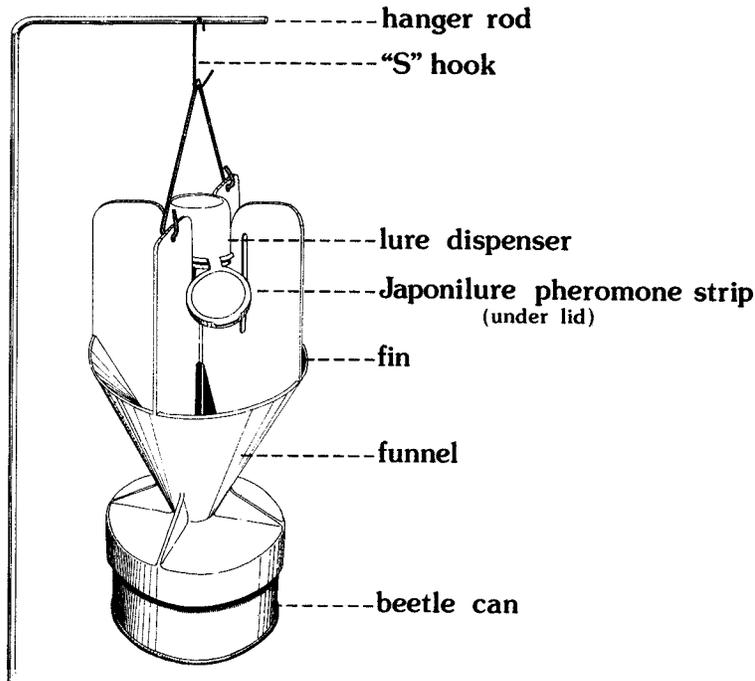
**TRAP RELOCATION:** Within the sterile release area of the Preventative Release Program, the relocation of traps is according to the following guidelines:

1. Relocate the traps as needed to hosts with ripe or near ripe fruit on an interval of 6-12 weeks.
2. Relocate the trap within its area of responsibility with a minimum relocation distance of 300 feet. Any one trap will stay within the 1/20 sub-grid when trapping at a density of 20 traps per square mile.
3. Consider using a well foliated host tree with honeydew when a fruiting host is unavailable.

**PROGRAM:** Japanese Beetle Trapping

**TYPE OF TRAP:** Japanese Beetle

This plastic trap (Fig. 1) consists of four fins attached to a funnel which directs beetles into a screw-on can at the bottom of the trap. An "S" hook suspends the entire trap from a metal rod. The new style rods do not require "S" hooks (see color photo below). Beetles respond to the attractants, fly into the fins, and fall down the funnel into the beetle can.



**FIGURE 1. JAPANESE BEETLE TRAP**

**ATTRACTANTS:** There are three components to the attractancy of the Japanese beetle trap. See table below.

Trap Component	Stimulus	Response
Lure Dispenser	Phenethyl propionate, Eugenol & Geraniol	Feeding
Pheromone Strip	Japonilure	Sexual response by male
Trap	Green color	Visual

**TRAPPING SEASON:** Traps may be deployed prior to June 1, with the first servicing planned after June 15, and removed at the last regular servicing after September 1.

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Trapping Period												

**TRAP DENSITY:** Detection Survey - Use two traps per square mile in both urban areas and rural residential areas of 300 or more homes per square mile.

Delimitation Survey - When a Japanese beetle is trapped, densities will increase in the 49 square miles surrounding the find (Fig. 2). A total of 450 traps will be required. Trap deployment should be completed within 48 hours. Half-sheet trap cards (Form 60-206) may be used for this purpose.

**JAPANESE BEETLE DELIMITATION TRAPS PER SQUARE MILE**

**JAPANESE BEETLE TRAP TOTALS**

5	5	5	5	5	5	5
5	5	5	5	5	5	5
5	5	25	25	25	5	5
5	5	25	50	25	5	5
5	5	25	25	25	5	5
5	5	5	5	5	5	5
5	5	5	5	5	5	5

1 Mile Scale

- Core Area: 1 sq. mile = 50 traps
- 1 mile buffer: 8 sq. miles = 200 traps
- 2 mile buffer: 16 sq. miles = 80 traps
- 3 mile buffer: 24 sq. miles = 120 traps
- Total: 49 sq. miles = 450 traps

**FIGURE 2.**

**INSPECTION FREQUENCY:** Inspect traps every two weeks for detection. For delimitation or intensive survey, inspect daily until determined otherwise.

- HOSTS:**
- Turf - larval host
  - Roses - especially yellow and light colored varieties
  - Grapes
  - Most deciduous fruit trees - especially apple; also cherry, peach, apricot, pomegranate, pistachio, almond, etc.
  - Shade trees - California black oak, valley oak, olive, strawberry tree, weeping willow, etc.
  - Most shrubs - including cotoneaster, ceanothus, pineapple guava, heavenly bamboo
  - Corn, soybean, and asparagus
  - Many weeds

**SELECTION OF TRAPPING SITES:** A location where turf as well as other hosts are available is preferable when choosing a trap site. Priority should be given to selecting a property with turf and roses.

**NOTE: HIGH-HAZARD TRAPPING:** Beetles have hitchhiked aboard planes originating in the eastern United States. Therefore, airports having a large volume of flights arriving from the east coast are considered to be a high risk for Japanese beetle introduction.

Trap density and placement on and around the airport should be discussed with your district entomologist.

**HANGING THE TRAP:** All Japanese beetle traps must be placed so that they receive full sunlight from 10:00 a.m. to 3:00 p.m. They must also be placed out in the open, avoiding obstacles such as houses and fences (including chain link) that interfere with lure dispersal and trap efficiency. Traps are to be placed no closer than 10 feet away from hosts (excluding turf). In some cases this distance could be greater to have the trap properly placed in an open area. Placing the trap near or in contact with host foliage may result in beetles landing on the host plant rather than falling down into the beetle can. Do not place the trap under foliage where debris may fall into the trap and block the funnel opening. Traps should not be placed in such a manner that will impede the safe operation of lawn care equipment. (The edge of the lawn or just off the turf is best.)

Trap placement and trap height will depend upon the hosts that are available at the selected site. When only turf or turf and a high growing host (tree) is available, the trap height will be 11 to 22 inches from the funnel rim to the ground (Fig. 3). When turf and a low growing host (roses, grapes, etc.) are available, then the trap height will be at host level (Fig. 4).

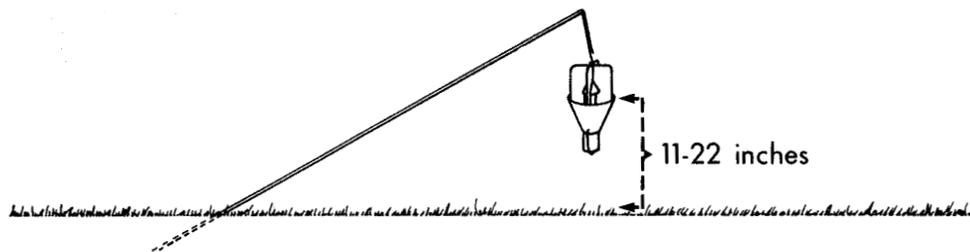


FIGURE 3. TRAP HEIGHT FOR TURF OR TURF WITH A HIGH HOST.

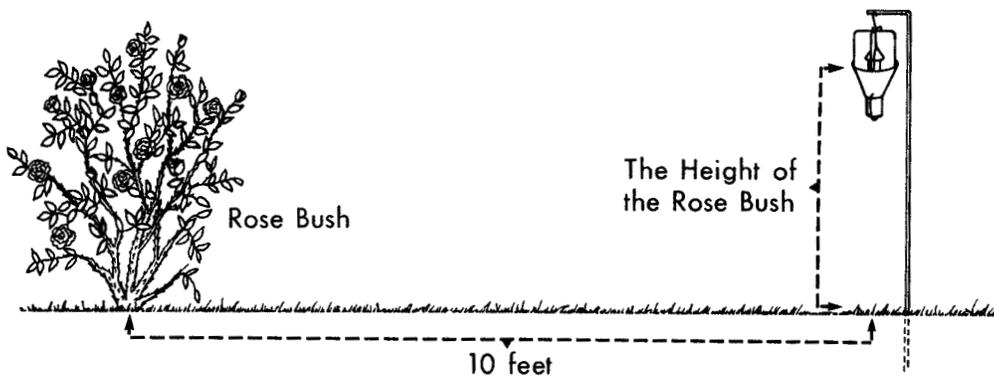


FIGURE 4. TRAP HEIGHT FOR A LOW HOST.



**GOOD PLACEMENT**



**GOOD PLACEMENT**



**POOR PLACEMENT**  
(Too close to fence.)

To deploy the trap:

1. Push the hanger rod into the ground so that it is stable and will support the trap at the desired height from the ground.
2. Suspend the trap from the arm of the hanger rod so that it swings freely.
3. Affix one Japonilure pheromone strip to the top or bottom of the lure dispenser lid or to one of the trap fins. Alternate pheromone dispensers may be in the form of a rubber septa. When these are used they should be secured firmly in the hole provided on one fin of the trap.
4. Place and date the lure dispenser in the trap as depicted in Figure 1.
5. Place clear tape (six inches long) on trap funnel or beetle can for recording trap number and service data.

**TRAP INSPECTION AND SERVICING:** Inspect the trap by removing the beetle can, and examine the contents while specimens are still in the can. Exercise caution while servicing the trap; the beetle(s) may be alive and could escape, or dried specimens could be lost in the wind. Remove any debris that has accumulated in the funnel of the trap, **including** cobwebs. Mark the date tape at each servicing.

**COLLECTION AND SUBMISSION OF SAMPLES:** Collection methods for suspect Japanese beetles will vary as to whether the beetles are found dead or alive.

Live beetles will be placed in alcohol vials only. (See instructions for shipping on page xii.)

Dead beetles will be placed in dry vials only. Trapped dead beetles are tested by the lab for traces of alcohol. The presence of alcohol would indicate a possible “planted” specimen.

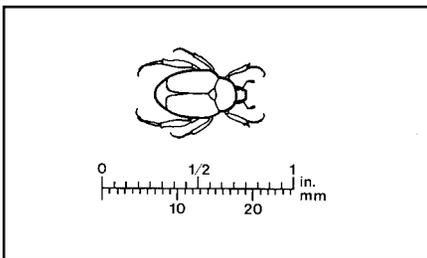
Send specimens to Sacramento with a Standard Form 65-020, “Pest and Damage Record” (PDR). Be sure the specimens are marked “RUSH”, both on the identification slip, and on the outside of the package. Include the trap number in the “Remarks” section of the PDR Form.

**BAITING INTERVAL:** The lure dispenser and pheromone are to be replaced during midseason. The lure dispenser should be dated when placed or exchanged. NOTE: the design of the lure dispensers may change from year to year.

**TRAP RELOCATION:** No trap relocation is needed.



Walker, Bradford E., Vermont Department of Forests, Parks and Recreation.  
Image 4836022. ForestryImages.org <http://www.forestryimages.org/>. December 24, 2001.



**JAPANESE BEETLE**  
*Popillia japonica* Newman



**PROGRAM:** Khapra Beetle Trapping

**TYPE OF TRAP:** Trogotrap

The Trogotrap is made from 3" x 4" pieces of corrugated cardboard, with an attractant food paste spread inside in the corrugations (Fig. 1). Insects of stored food products enter the corrugated cardboard for food, shelter, and reproduction. All life stages may be present. A strip of reflecting tape is attached to the outside to facilitate finding the trap with a flashlight.



**FIGURE 1. TROGOTRAP**

**ATTRACTANT:** A food paste made of powdered milk, ground-up insect bodies, and wheat germ.

**TRAPPING SEASON:** Year-round.

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Trapping Period												

Inspection of traps should be timed when the lowest amounts of storage are present. Otherwise, inspection can be made anytime during the year.

**TRAP DENSITY:** Detection Survey - In high-hazard facilities with adequate food, warm shelter, and/or high introductory risk, traps should be about 50 feet apart.

**INSPECTION FREQUENCY:** The inspection of old traps and the replacement with new traps is recommended twice a year.

**HOSTS:** All grain and grain products. In the United States, Khapra beetle has been found infesting unprocessed stored materials such as: wheat, oats, rye, barley, flaxseed, pinto beans, black-eyed peas, sorghum, alfalfa seed, cotton seed, and castor beans.

Preferred processed materials include: corn meal, flour, bread, cottonseed meal, cottonseed cake, oats, breakfast cereals, crackers, dog food, powdered milk, raisins, and nutmeats.

Recent infestations of Khapra beetle in the United States have been associated with spices. Burlap bagging on either food or non-food products may be infested; paper boxes and packing materials used with steel products, art objects, and other items imported from Khapra beetle infested areas are also suspect.

**SELECTION OF TRAPPING SITES:** Investigate storage facilities of Khapra beetle host material. Particular emphasis should be given to high-hazard facilities receiving products from foreign countries, especially Asia and Africa. Examples of high-hazard facilities are: large food mills, wholesale bakeries, wholesale spice centers, seed companies, burlap bag cleaning establishments, carpet mills, import stores, etc.

**PLACING THE TRAP:** Possible habitats of Khapra beetle are areas where debris accumulates, areas with low light levels, and/or cracks and crevices. Traps may be placed on ledges or behind electrical conduits near host material, in tunnels under mills or storage tanks, and near where used sacks are kept. Since Khapra beetle does not fly, it is desirable to place traps on floors when practical. Khapra beetle favors the warmer sides of the building, thus trap numbers should be greater in these areas. Traps should be dated and numbered. Maps of trap locations should be made to help in finding the traps.

**TRAP INSPECTION AND SERVICING:** Inspection of the trap should be made in a well lighted area protected from the wind. To inspect, carefully tear both surfaces off in order to expose any specimens within the corrugations. Send in cast skins (as well as whole larvae) as these can be identified. Avoid carrying traps in a pocket or any container which may result in moving live specimens to other locations. Traps should be inspected and disposed of at the same building in which they were deployed.

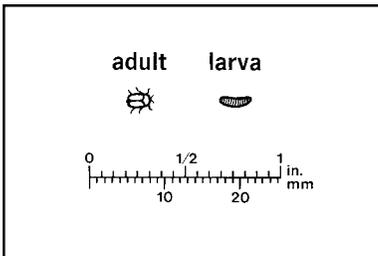
**COLLECTION AND SUBMISSION OF SAMPLES:** It is not necessary to use a separate alcohol vial for each trap, but a separate vial and "PDR" slip (Standard Form 65-020, "Pest and Damage Record") should be used for each building. Trogotrap collections should be kept in separate alcohol vials from insects found through visual inspection. Specimens which are definitely observed by the collector to be alive and moving should be placed in a separate vial from skins and whole specimens which are not obviously alive. The cork of the vial with specimens found alive should be marked with an "A;" the one with those collected dead should be marked "D." These indications should also be placed on the identification slip. For "Host" line on "PDR" slip, write "Trogotrap" and the trap number you have assigned to that trap. If there is urgency in obtaining the identification, mark "RUSH", both on the identification slip, and on the outside of the package. (See instructions for shipping on page xii.) Include the trap number in the "Remarks" section of the PDR Form.

**BAITING INTERVAL:** See section on inspection frequency.

**TRAP RELOCATION:** No relocation is required.

**TRAP STORAGE:** The traps are fumigated after being manufactured and kept in a sealed container. Since the plastic bags in which traps are delivered will not prevent infestation by *Trogoderma* spp., it is best to order traps just prior to when deployment is planned. Any storage at the county office should be in a sealed container (preferably an air-tight plastic container) to avoid possible infestation. Use only clean traps in Khapra beetle surveys.

**VISUAL INSPECTION:** In bulk storage, Khapra beetle larvae tend to congregate on the surface of the grain and on or near the walls. Inspection of bulk grain is facilitated by the use of a two-pan set of grain dockage sieves. A small portion of grain is scooped into the set of pans, and shaken slightly so that the chaff and small insects fall through the sieve into the solid bottom pan. Some likely places to search thoroughly are the ledges, cracks, and crevices in walls or floors, tunnels under tanks or mills, and particularly empty burlap sacks. When inspecting sacked materials, special attention must be paid to the seams and ears of the sack. A flashlight, forceps, model paint brush, and an ice pick with a flattened point are necessary tools for efficient inspection. As field determination is impossible, all *Trogoderma* spp. must be submitted to a taxonomist for identification. Any unusual insects or insects present in unusually large numbers should be submitted. Be sure to note "alive" or "dead" on the "PDR" slip.



**KHAPRA BEETLE**  
*Trogoderma granarium* Everts

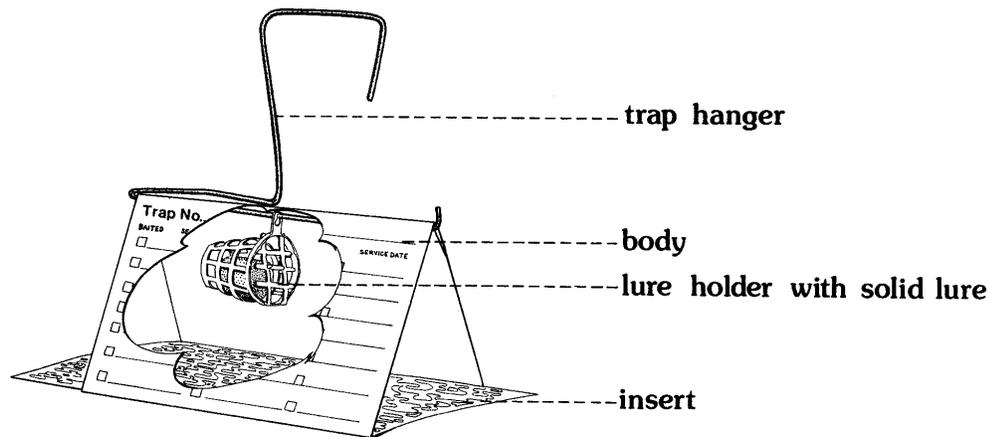


**PROGRAM:** Mediterranean Fruit Fly (Medfly) Trapping

**TYPE OF TRAP:** Jackson Trap (In all State operated programs the ChamP™ trap will replace the Jackson trap)

The delta-shaped Jackson trap is made of plastic-coated cardboard. The solid lure plug is contained in a plastic cage suspended from the inside of the trap (Fig. 1). A sticky insert on the bottom captures flies.

The trap consists of five parts: trap body, insert, basket, solid lure, and trap hanger. Trap hangers are reusable and should be saved.



**FIGURE 1. JACKSON TRAP**



**FIGURE 2. JACKSON TRAP**

**ATTRACTANT:** Trimedlure (TML)

This lure acts primarily as a male attractant. When there is a high population level or an absence of males, females may enter the trap. There is no insecticide in the lure. A reddish pigment has been added as an identifying color.

**TRAPPING SEASON:** Southern California - Year-round, subject to host availability.

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Trapping Period												

Imperial County - November through May. Trapping shall commence on November 1 and end on May 31.

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Trapping Period												

Coachella Valley - September through June. Trapping shall commence on September 1 and end on June 30.

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Trapping Period												

Southern San Francisco Bay - April through November. Trapping shall commence on April 1 and end on November 30, subject to host availability.\*

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Trapping Period												

All Other Areas - May through October. Trapping shall commence on May 1 and end on October 31, subject to host availability.\*

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Trapping Period												

\* Some counties may have a much shorter season due to cooler climates and lack of suitable hosts.



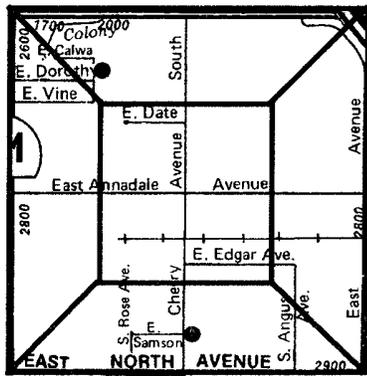


FIGURE 6.

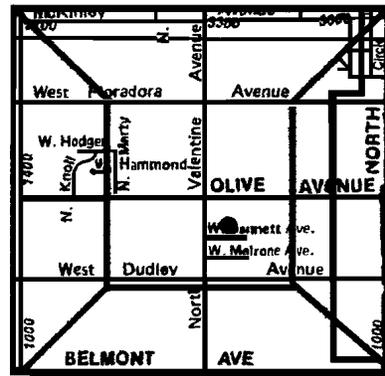


FIGURE 7.

Delimitation Survey - When a Medfly is collected in an area, trimedlure baited traps are placed in a 100-50-25-20-10 per-square-mile trap array sequence over 81 square miles. Traps in the core mile and the surrounding eight miles will be Champ™ traps baited with trimedlure. Additionally, 25 Integrated Pheromone McPhail Traps (IPMT) baited with the Heath three component lure (ammonium acetate, putrescine, and trimethylamine) will be placed in the core mile (Fig.8). The IPMT traps are in addition to the detection McPhail traps baited with either torula yeast or Nu-Lure (Table 1, MP-3) already in place. Trap densities within the core square mile are increased within 24 hours. All traps within the 81 square mile area should be in place within 72 hours (see action plan for medfly revised December 1999).

**MEDFLY DELIMITATION TRAPS PER SQUARE MILE**

10	10	10	10	10	10	10	10	10
10	20	20	20	20	20	20	20	10
10	20	25	25	25	25	25	20	10
10	20	25	50	50	50	25	20	10
10	20	25	50	<sup>25</sup> / <sub>100</sub>	50	25	20	10
10	20	25	50	50	50	25	20	10
10	20	25	25	25	25	25	20	10
10	20	20	20	20	20	20	20	10
10	10	10	10	10	10	10	10	10

1 Mile Scale

**CHAMP™ & JACKSON TRAP TOTALS**

Core Area:	1 sq. mile	=	100 traps
1 mile buffer:	8 sq. miles	=	400 traps
2 mile buffer:	16 sq. miles	=	400 traps
3 mile buffer:	24 sq. miles	=	480 traps
4 mile buffer:	32 sq. miles	=	320 traps
Total:	81 sq. miles	=	1,700 traps

FIGURE 8.

**INSPECTION FREQUENCY:** Detection Survey - Once every 14 days with the following exception:

1. Once a month for rural trapping. (See also MF-7 "Trap Relocation.")

Delimitation Survey - Servicing is to be conducted daily in the core square mile during the first week. Traps in the eight square miles surrounding the core are serviced every two days. All other traps should be checked at least once within the first week.

**HOSTS:** The selection of the best host at each trap location is the most important phase of an effective detection program. Priority must be given to hosts with mature or nearly mature fruit as listed in the Host Preference List.

**Host Preference List**

(with nearly mature or mature fruit and foliage)

<u>Class I Hosts</u> (Exceptional Hosts)	Apricot * Coffee* Nectarine *	Peach *	
<u>Class II Hosts</u> (Good Hosts)	Acerola Calamondin Catalina cherry Cherimoya Guava ( <i>Psidium</i> spp.) (i.e.: Mexican guava, strawberry guava, etc.)	Holly-leaved cherry Kumquat Loquat Papaya Persimmon Sour orange Tangerine	White sapote
<u>Class III Hosts</u> (Acceptable Hosts)	Apple Avocado Common jujube Cherry Fig Grapefruit Jaboticaba Kaffir plum	Lime Longan Mango Medlar Orange Pear Pineapple guava ( <i>Feijoa sellowiana</i> )	Pummelo Plum Quince Sapodilla Tangelo Yellow Oleander
<u>Class IV Hosts</u> (Lesser Hosts)	Lemon Lychee	Olive Pomegranate **	Walnut ***

\* Does not need mature fruit. Excellent host when fruit is two-thirds or more developed.

\*\* A host only when cracked or injured.

\*\*\* A host only when husk is fleshy (not a host when husk is split or dried).

**SELECTION OF TRAPPING SITES:** Selection of a trap site will depend on two main criteria: a suitable host tree and uniform trap distribution as traps are moved throughout the assigned area. First consideration should be given to the availability of suitable hosts with fruit. A suitable host can be defined as one of the listed host plants with mature or nearly mature fruit and foliage, and one that meets the criteria for trap placement as described under “Hanging the Trap.” If there is a choice between two or more possible trap locations with hosts of equal status, preference should be given to the site that has multiple hosts, either of the same variety or different varieties. However, shade and shelter, particularly in hot weather, also influence host selection by fruit flies. Thus, a tree with good foliage near (within 20 feet) a sparsely foliated host tree with fruit may be a preferable site to hang a trap. Or, if there are fruiting host trees chosen at a location that are too small, then a trap may be placed in a nearby (within 20 feet) non-host tree if it provides proper height and shade.

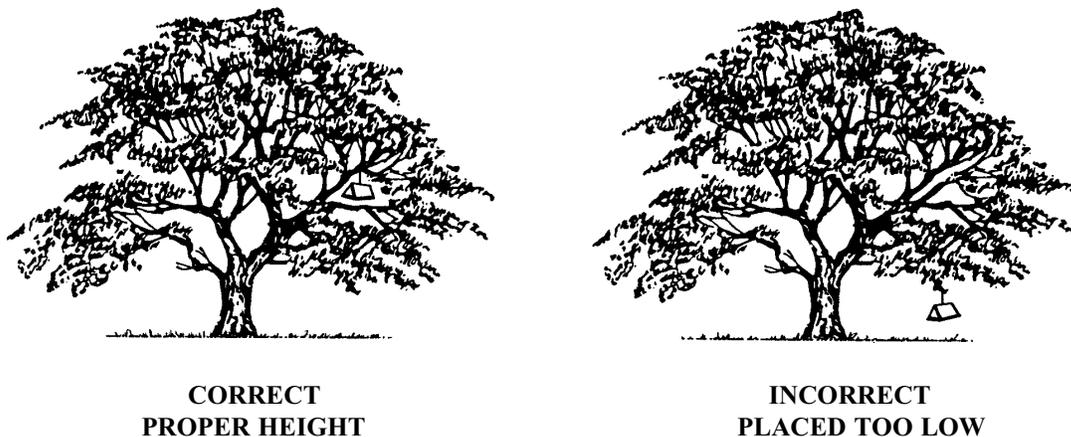
**HANGING THE TRAP:** Assemble the trap by first writing the trap number and date of deployment on both the trap body and sticky insert. The trap body is then opened; the bottom is pushed upward and firm pressure is applied laterally. **THIS IS IMPORTANT!** When pressure is released, the trap bottom will remain flat. The sticky insert is slid into place. It will fit tightly, if properly done. The lure holder and lure are then prepared according to instructions on MF-9. The trap is now fully assembled (see Figure 1).

Place the trap in the warmest part of the tree in open shade (**not in full sunlight at any time**). During extremely hot weather, traps may need to be moved to other areas of the tree. Traps should be placed in the upper 1/2 to 1/3 of the tree canopy, 1/2 to 2/3 the distance from the trunk to the outer edge of the foliage. Lower levels are acceptable only if it is impossible to find a desired spot higher in the tree. Before placing a trap at lower levels in a tree, safety to children and the security of the trap must be considered.

It should not be placed in dense foliage that may block the trap entrance or give the fly a resting place that would prevent it from entering the trap.

Maintain a foliage-free space of 12 to 18 inches around the trap, but be sure foliage and ripening fruit surround the trap beyond that distance, particularly to the bottom and sides. Traps should never be hung below the foliage canopy, nor should they be closer than four feet to the ground (Fig. 9).

Citrus trees with compact foliage may present a problem. However, the trap should still be placed near the outer periphery of the tree near the fruit. Usually a small break in the foliage can be found where leaves and branches can be manipulated away from the entrances to the trap. Do not place the trap inside of the tree beyond the foliage.



**FIGURE 9.**

**TRAP INSPECTION AND SERVICING:** When inspecting traps, the following steps should be taken:

1. Remove the trap from the tree.
2. Pull out insert and examine entire area of stickum.
3. Remove leaves and debris from stickum as flies could be beneath these objects. Be certain that the sticky surface is not rendered less effective by dust or debris. The stickum must remain optimally sticky to capture flies.
4. If no flies are found, replace insert, date trap and rebait, if necessary, according to the recommended baiting interval and suggested handling techniques.
5. Change inserts every month or more often as needed. Always change the insert when relocating the trap. Mark new inserts with the trap number and placement date.
6. Replace lure according to the table below. Avoid contamination when handling baskets and plugs.
7. Trap bodies eventually lose their shape, become filled with trap servicing data, or otherwise deteriorate. When this occurs, they should be replaced.

**COLLECTION AND SUBMISSION OF SAMPLES:** The entire trap insert containing the suspect fly should be collected for supervisory review. Specimens submitted to Sacramento should be cut from the sticky insert and placed in a dry vial for submission. Use care to prevent damage to the specimen. Send the specimen to Sacramento with a Standard Form 65-020, "Pest and Damage Record" (PDR). Be sure the identification slip and the outside of the package are marked "RUSH." Include the trap number in the "Remarks" section of the PDR Form.

**BAITING INTERVAL:** Since evaporation of the lure is temperature dependent, the rebaiting schedule will depend upon the weather. Some guidelines are given below; however, trapping supervisors will have to be alert to the possibility that their particular situation may require different schedules (see table below).

Season	Solid Lure (2 Grams)	Solid Lure (4 Grams)
Spring-Summer (Daytime highs of 70° to 90° F)	6 weeks	10 weeks
Hot Summer (Daytime highs 90° F or over)	4 weeks	6 weeks
Winter	12 weeks	18 weeks

**TRAP RELOCATION:** Trimedlure has a limited drawing range. Therefore, a trap cannot be expected to effectively cover the entire area to which it is assigned from a single location. To overcome the limitations of the lure, the trap **MUST** be relocated. Relocations **MUST** be made when fruit at the trap site is gone. No trap should exceed six weeks at one location over a 12 month period when suitable alternate host sites are available. When relocation sites are limited, traps can remain longer than six weeks, as long as fruit is available at the trap site. Relocations should provide for moving the trap evenly throughout its assigned area, with a minimum relocation distance of 500 feet. Rural traps should be relocated monthly when serviced and moved to a new section in its assigned six square mile area.

For Southern California and the Southern San Francisco Bay Area, a minimum of 100 traps sites per square mile are to be identified. No less than 80 of these sites shall be used each year. The remaining 20 sites should be factored into the relocation plan for the next year. Newly identified sites may be added at any time.

For the other urban areas, a minimum of 50 trap sites per square mile are to be identified. No less than 25 of these sites shall be used each year. In the second year, utilize 60 percent of the trap sites not used, and the remaining 40 percent in the third year. Combine the new trap sites with some of the original 25 trap sites to assure use of a total of 25 annually. Newly identified sites may be included at any time.

For efficient and effective trapping, the trapper should schedule relocations in advance. If a desired fruiting host tree cannot be located, either because of lack of hosts or lateness of the season, then a trap should not be placed or maintained. This means that certain square miles may have fewer traps than the proposed level.

**Trimedlure: t BUTYL - 4 (or 5) - chloro -  
2-methyl cyclohexane carboxylate**

A pheromone trap product for use in pheromone trap applications.

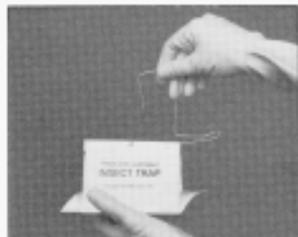
This product is specific to the Mediterranean Fruit Fly (*Ceratitis capitata*).

**WARNING! IRRITATES EYES.** Avoid eye contact. **IN CASE OF EYE CONTACT**, flush eyes immediately with water for fifteen minutes. Obtain medical attention. Dispose of in an approved manner for general organic chemical waste materials.

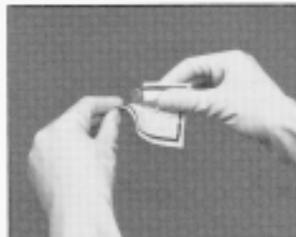
Before handling please read the Materials Safety Data Sheet for detailed use and health information.

**STORE IN A COOL PLACE - AVOID HEAT!**

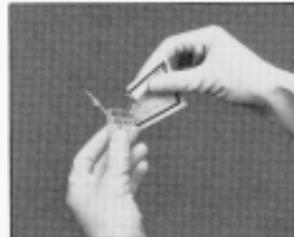
**SUGGESTED HANDLING TECHNIQUES for baiting the Jackson trap**



**1** Remove bar from the trap



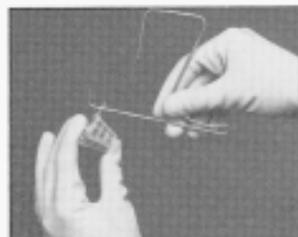
**2** Tear open the pouch - do not touch the lure



**3** Hold the basket and empty the lure into the basket



**4** Close the gate



**5** Place basket onto the bar



**6** Place loaded trap in appropriate monitoring location

**To rebait:** remove trap from tree - empty spent plug into appropriate waste container. Insert new plug as per above.

**SHIPPING LIMITATION:** None

**DOT CLASSIFICATION:** None

**PACKAGING**

Magnet TML 70-0 Lures are individually packaged in a 3½" x 3¾" airtight, impermeable pouch (4 gms) and shipped in cases of 400.

**STORAGE AND SHELF LIFE**

When stored at room temperature in sealed packages, AgriSense certifies that Magnet TML 70-0 Lures will meet sales specifications for a period of 12 months from date of shipment.

**MATERIALS SAFETY DATA SHEET**

Materials Safety Data Sheet on the Magnet TML 70-0 Lures may be obtained by writing or calling AgriSense, 4230 West Swift, Suite 106, Fresno, CA 93722, Telephone (209) 276-7037.

**WARRANTY**

**PLEASE READ CAREFULLY:**

AgriSense believes that the information in this publication is an accurate description of the typical characteristics and/or uses of the Magnet TML 70-0 Lure, but it is the user's responsibility to thoroughly test the product in specific applications to determine its performance, efficacy and safety.

Unless AgriSense provides the user with a specific written warranty of fitness for a particular use, AgriSense's sole warranty is that the product or products will meet AgriSense's then current sales specifications. AgriSense SPECIFICALLY DISCLAIMS ANY OTHER EXPRESS OR IMPLIED

WARRANTY, INCLUDING THE WARRANTIES OF MERCHANTABILITY AND OF FITNESS FOR USE. The user's exclusive remedy and AgriSense's sole liability for breach of warranty is limited to refund of the purchase price or replacement of any product shown to be other than as warranted, and AgriSense expressly disclaims any liability for incidental or consequential damages.

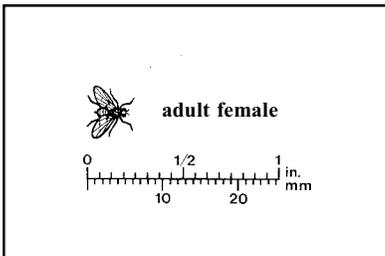
This product is not a registered pesticide. Before handling, read the Product and Materials Safety Data Sheet for detailed use and health information.

AgriSense polymer entrapment systems are protected by patents and patents pending.





Photo by Jack Clark, University of California, Agriculture and Natural Resources



**MEDITERRANEAN FRUIT FLY**  
*Ceratitits capitata* (Wiedemann)



**PROGRAM:** Mediterranean Fruit Fly (Medfly) Trapping

**TYPE OF TRAP:** Yellow Panel Trap

The yellow panel trap (Fig. 1) is a two-sided sticky cardboard panel with Trimedlure (TML) incorporated into the stickum.



**FIGURE 1. YELLOW PANEL TRAP**

The trap consists of two parts: a yellow panel coated with TML stickum and a trap hanger. A paper clip (frictioned clips are recommended) or staple is used to secure the trap together.

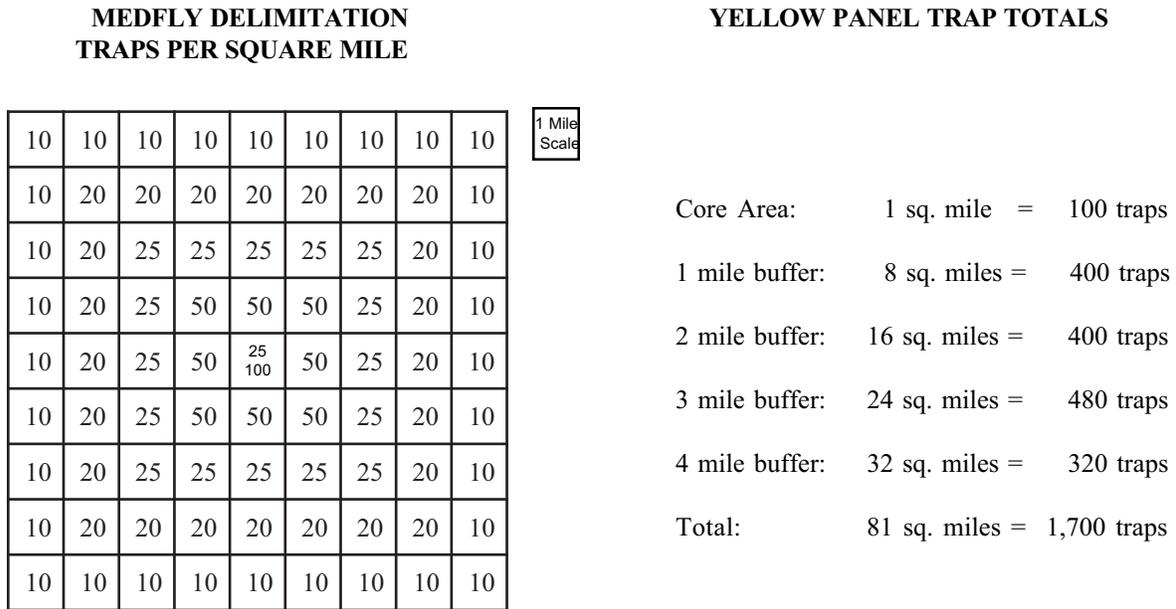
**ATTRACTANT:** Trimedlure (TML)

This lure acts primarily as a male attractant. When there is a high population or an absence of males, females may be drawn to the trap. There is no insecticide in the lure.

All traps are packaged in plastic bags, boxed and dated. Traps should remain in the sealed plastic bags until deployment. TML baited yellow panel traps should be used within four months of the date of packaging. Store traps at room temperature or below to prevent the stickum from oozing out.

**TRAPPING SEASON:** Determined by project management.

**TRAP DENSITY:** At this time, yellow panel traps are primarily used for delimitation trapping and the recommended density will be determined by project management. An example of trap densities for delimitation is as follows (Fig.2).



**FIGURE 2.**

When a Medfly is collected in an area, trimedlure baited traps are placed in a 100-50-25-20-10 per square mile trap array sequence over 81 square miles. Additionally, 25 McPhail traps baited with either Nu-Lure or Torula yeast are placed in the core mile.

**NOTE:** All sticky traps in the core square mile area are to be yellow panel traps. The remaining delimitation area may include the existing detection Jackson traps as part of the required totals.

**INSPECTION FREQUENCY:** Detection survey - once every seven or fourteen days as required.

Delimitation Survey: Servicing is to be conducted daily in the core square mile during the first week. Traps in the eight square miles surrounding the core are serviced every two days. All other traps should be checked at least once within the first week.

**HOSTS:** The selection of the best host at each trap location is the most important phase of an effective trapping program. Priority must be given to hosts with mature fruit as listed in the Host Preference List.

**Host Preference List**

(with nearly mature or mature fruit and foliage)

<u>Class I Hosts</u> (Exceptional Hosts)	Apricot * Coffee * Nectarine *	Peach *	
<u>Class II Hosts</u> (Good Hosts)	Calamondin Catalina cherry Cherimoya Guava ( <i>Psidium</i> spp.) (i.e.: Mexican guava, strawberry guava, etc.) Holly-leaved cherry	Kumquat Loquat Papaya Persimmon Sour orange Tangerine White sapote	
<u>Class III Hosts</u> (Acceptable Hosts)	Apple Avocado Cherry Common jujube Fig Grapefruit Kaffir plum	Lime Mango Orange Pear Pineapple guava ( <i>Feijoa sellowiana</i> ) Pummelo	Plum Quince Tangelo
<u>Class IV Hosts</u> (Lesser Hosts)	Lemon Olive	Pomegranate ** Walnut ***	

\* Does not need mature fruit. Excellent host when fruit is two-thirds or more developed.

\*\* A host only when cracked or injured.

\*\*\* A host only when husk is fleshy (not a host when husk is split or dried).

**SELECTION OF TRAPPING SITES:** Selection of a trap site will depend on two main criteria: a suitable host tree and uniform trap distribution throughout the assigned area. First consideration should be given to the availability of suitable hosts with fruit. A suitable host can be defined as one of the listed host plants with ripe fruit and foliage, and one that meets the criteria for trap placement as described under "Hanging the Trap." If there is a choice between two or more possible trap locations with hosts of equal status, preference should be given to the site that has multiple hosts, either of the same variety or different varieties. However, shade and shelter, particularly in hot weather, also influence host selection by fruit flies. Thus, a tree with good foliage near (within twenty feet) a sparsely foliated host tree with fruit may be a preferable site to hang a trap. Or, if there are fruiting host trees chosen at a location that are too small, then a trap may be placed in a nearby non-host tree if it provides proper height and shade.

**HANGING THE TRAP:** Place the trap in the warmest part of the tree in open shade (**not in full sunlight at any time**). During extremely hot weather, the stickum may "run" and traps may need to be moved to other areas of the tree. Traps should be placed in the upper 1/2 to 1/3 of the tree canopy whenever possible, 1/2 to 2/3 the distance from the trunk to the outer edge of the foliage. Lower levels are acceptable only if it is impossible to find a desired spot higher in the tree. Traps should never be hung below the foliage canopy, nor should they be closer than four feet to the ground. Before placing a trap at lower levels in a tree, safety to children and the security of the trap must be considered.

The trap should not be placed in dense foliage. Use extreme care when placing the panel trap in the tree to avoid contaminating the leaves or fruit with the trimedlure stickum.

If possible, maintain a foliage-free space of 12 to 18 inches around the trap, but be sure foliage and ripening fruit surround the trap beyond that distance, particularly to the bottom and sides. Compact foliage in some citrus trees may present a problem when placing the trap. However, the trap should still be placed near the outer periphery of the tree near the fruit. Usually a small break in the foliage can be found where leaves and branches can be manipulated away from the trap. Do not place the trap inside the tree beyond the foliage.

**TRAP INSPECTION AND SERVICING:** When inspecting traps, the following steps should be taken:

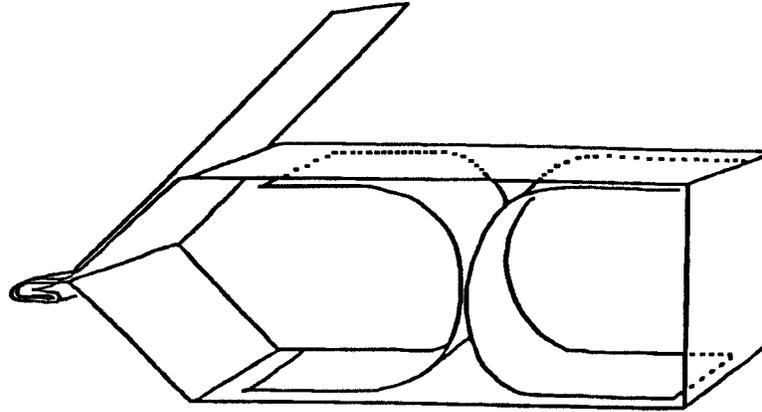
1. Remove the trap from the tree.
2. Examine the **entire** area of stickum on both sides of the panel. Do not neglect to examine the border areas, particularly along the perforated seam.
3. Remove leaves and debris from stickum as flies could be beneath these objects. Be certain that the sticky surface is not rendered less effective by dust or debris. The stickum must remain optimally sticky to capture flies.
4. Date trap on tabs at either the top or side. Replace trap every two weeks or more often if the trap becomes dirty.
5. Always use a new trap when it is relocated. Mark the new trap with the trap number and placement date on both halves.
6. Yellow panel traps contaminate trap poles. A pole contaminated with TML stickum should not be used on other type traps unless a sleeve for covering the pole has been used to keep the pole free of stickum. Trap poles should be cleaned frequently with an effective cleaner (e.g. "Goop").
7. In addition, since the use of yellow panel traps results in stickum transfer onto hands, the vehicle, and other trapping equipment, a cleaner should be used to reduce stickum accumulation.

NOTE: Trap hangers used with yellow panel traps should not be used on Jackson traps because of concern for stickum contamination.

**COLLECTION AND SUBMISSION OF SAMPLES:** When collecting samples for identification, the following steps should be taken:

1. Remove the trap hanger. Tear trap in half along the perforated seam. Use care to prevent damage to the specimen.
2. Fold each half of the trap containing a specimen according to the illustration (Fig. 3), sticky side in, and slide it into a #4 paper bag. Staple the Standard Form 65-020, "Pest and Damage Record" (PDR) or equivalent "Project Submission Form" to the outside of the bag. Specimens submitted to Sacramento should be cut from the sticky insert and placed in a vial for submission.

In sending specimens to Sacramento, be sure the identification slip and the outside of the package are marked "RUSH." Include the trap number in the "Remarks" section of the PDR Form.



**FIGURE 3.**

**BAITING INTERVAL:** Yellow panel traps are replaced every two weeks with a fresh trap.

**TRAP RELOCATION:** Trimedlure has a limited drawing range. Therefore, a trap cannot be expected to effectively cover the entire area to which it is assigned from a single location. To overcome the limitations of the lure, the trap **MUST** be relocated. Relocations **MUST** be made when the fruit at the trap site is gone.

**INSPECTION FREQUENCY:** Detection Survey: No trap should exceed six weeks at one location over a twelve-month period. Relocations should provide for moving the trap evenly throughout its assigned area. The trapper should schedule relocation sites in advance. If a desired fruiting host cannot be located either because of lack of hosts or lateness of the season, then a trap should not be placed or maintained. This means that certain square miles may have fewer traps than the proposed level.

Delimitation Survey: Within the delimitation area, trap relocation strategies will be determined by project management.



**PROGRAM:** Melon Fly (ML) Trapping

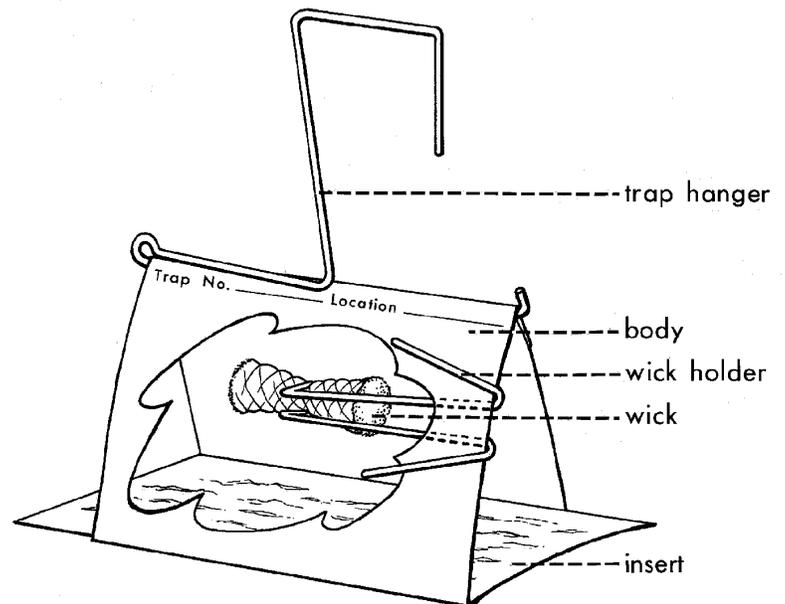
**TYPE OF TRAP:** Jackson Trap (In all State operated programs the Champ™ trap will replace the Jackson trap)

The delta-shaped Jackson trap is made of plastic-coated cardboard (Fig. 1). Lure is placed on a cotton roll wick, supported inside the trap by a wire wick holder. A sticky insert on the bottom captures flies.

The Jackson trap consists of five parts: trap body, insert, wick holder, wick, and trap hanger (Fig. 2). Trap hangers are reusable and should be saved.



**FIGURE 1. JACKSON TRAP**



**FIGURE 2. JACKSON TRAP**

**ATTRACTANTS:** Cue-lure (5% dibrom is added to the lure to stun the flies). This lure acts primarily as a male attractant. When there is an absence of males, females may enter the trap.

Color variation in the dibrom/lure mixtures is due to the reaction of the free bromine radical. Dibrom varies in color from light brown to dark brown. The color of the material does not interfere with its effectiveness. Improper storage and handling can cause the dibrom to break down. Users should order only as much material as needed during the year. Keep the dibrom/lure mixture in closed, darkened bottles in a cool place.

CUE-LURE		
Trap Component	Stimulus	Response
Wick	Cue-lure	Sexual response of male melon fly

Special instructions for the use of Cue-lure containing dibrom:

1. A copy of the Special Local Need (SLN) registration must be carried by each trapper using the lure (page xxiii).
2. The SLN instructions must be followed.
3. Pesticide labels must be carried by the trapper.
4. The following label should be attached to all service containers which contain dibrom as an addition to the lure. Complete the label by adding a local phone number where emergency calls can be directed.

<p style="text-align: center;"><b>DANGER</b> NALED + CUE-LURE</p> <p>Date Pkgd: _____ CA Dept. of Food &amp; Agriculture 3288 Meadowview Road Sacramento, CA 95832 (916) 445-6214 IN CASE OF EMERGENCY, NOTIFY:</p>
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5. The following additional label must be placed on the trap. The current phone number for the Poison Control Center is 1-800-876-4766.

Cotton wick contains 5 ml of 5% naled (an organophosphorous insecticide), and Cuelure® (an insect attractant).

May be irritating to eyes and skin. If in eyes, immediately flush with water. Wash skin with soap and water. Contact a physician if irritation persists.

For additional information, contact:

Para mayor información, comuníquese con:

Mecha de algodón contiene 5 ml de 5% naled (un pesticide organofosforado) y Cuelure® (un atrayente de insectos).

Puede causar irritación en los ojos y la piel. En case de contacto lávese los ojos inmediatamente con agua. Lávese su piel con agua y jabón. Si la irritación persiste comuníquese con un médico.

**TRAPPING SEASON:** Southern California - Year-round, subject to host availability.

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Trapping Period												

Imperial County - November through May. Trapping shall commence on November 1 and end on May 31.

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Trapping Period												

Coachella Valley - September through June. Trapping shall commence on September 1 and end on June 30.

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Trapping Period												

Southern San Francisco Bay Area - June through October. Trapping shall commence on June 1 and end on October 31, subject to host availability.

Other Urban Areas - June through October. Trapping shall commence on June 1 and end on October 31, subject to host availability.

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Trapping Period												

Mountain and northern counties and rural areas are not to be trapped.

**TRAP DENSITY:** Detection Survey - Southern California and Southern San Francisco Bay Area. - Use five traps per square mile in urban and rural residential areas of 300 or more homes per square mile (except Alameda, Contra Costa, Orange, Riverside, San Francisco, southern San Luis Obispo, Santa Barbara, Santa Clara, and Ventura counties should use five traps per square mile in urban areas and follow the schedule listed for rural residential areas on page MF-3).

Other Urban Areas - Use two traps per square mile in urban and rural residential areas of 300 or more homes per square mile, with the following exceptions: Mendocino, Lake, Amador and Calaveras counties use one trap per square mile. In Fresno, Kern, Kings, Madera, Marin, Merced, Sacramento, northern San Luis Obispo, Santa Cruz, San Joaquin, Stanislaus, Tulare, and Yuba use two traps per square mile in urban areas. In rural residential areas use an equivalent number of traps per square mile as outlined below.

<u>Residences/Square Mile</u>	<u>Number of Traps</u>
25 - 250	1
251 - up (urban)	2

Traps should be placed at a residence. If no host exists at a residence, then use a host tree closest to a residence.

Delimitation Survey - When a melon fly is trapped, Jackson traps with Cue-lure plus dibrom will be set out in a 50-25-15-10-5 per-square-mile trapping array over an 81-square-mile area. A total of 890 Jackson traps will be required. In addition, 25 McPhail traps baited with either torula yeast or Nu-Lure (Table 1, MP-5) will be deployed in the square mile around the find (Fig. 3). Deployment of all traps in the core mile should be made within 24 hours.

**MELON FLY DELIMITATION  
TRAPS PER SQUARE MILE**

5	5	5	5	5	5	5	5	5
5	10	10	10	10	10	10	10	5
5	10	15	15	15	15	15	10	5
5	10	15	25	25	25	15	10	5
5	10	15	25	$\frac{50}{25}$	25	15	10	5
5	10	15	25	25	25	15	10	5
5	10	15	15	15	15	15	10	5
5	10	10	10	10	10	10	10	5
5	5	5	5	5	5	5	5	5

1 Mile  
Scale

**JACKSON TRAP TOTALS**

Core Area:	1 sq. mi.	= 50 traps
1 mile buffer:	8 sq. miles	= 200 traps
2 mile buffer:	16 sq. miles	= 240 traps
3 mile buffer:	24 sq. miles	= 240 traps
4 mile buffer:	32 sq. miles	= 160 traps
Total:	81 sq. miles	= 890 traps

**FIGURE 3.**

**INSPECTION FREQUENCY:** Detection survey - once every two weeks.

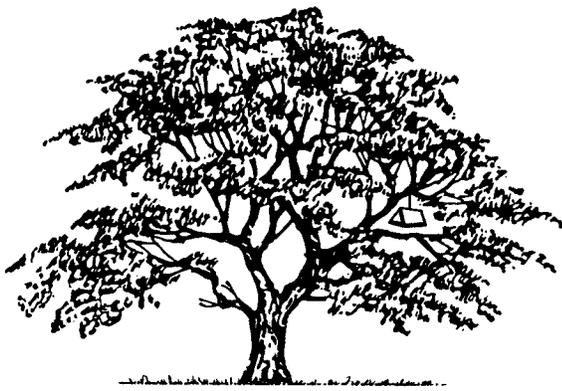
Delimitation Survey - Servicing is to be conducted daily in the core square mile during the first week. Traps in the eight square miles surrounding the core are serviced every two days. All other traps should be checked at least once within the first week. The Nu-Lure mixture should be reused after each servicing and replaced on a weekly basis.

- HOSTS:**
- Cucurbits (melon, squash, cucumber, pumpkin, etc.)
  - Tomatoes
  - Green beans
  - Chili pepper
  - Rarely, stone fruits and citrus

**SELECTION OF TRAPPING SITES:** First consideration when selecting a trap site for a melon fly trap should be given to the availability of prime hosts, i.e., melons, squash, cucumber, and pumpkin. Place the trap in a broadleaf tree (preferably a fruit tree) as close as possible to a prime host. In areas lacking sufficient prime hosts near which to place the traps, secondary hosts such as citrus and stone fruits may be selected as trap sites. Do not use conifers.

**HANGING THE TRAP:** Assemble the trap by first writing the trap number and date of deployment on both the trap body and sticky insert. The trap body is then opened; the bottom is pushed upward and firm pressure is applied laterally. **THIS IS IMPORTANT!** When pressure is released, the trap bottom will remain flat. The sticky insert is slid into place. It will bow up or down slightly and fit tightly, if properly done (Fig. 2).

Place the trap just out of reach, 1/2 to 2/3 the distance from the trunk to the outer edge of the foliage. It should not be placed in dense foliage that may block the trap entrance, or give the fly a resting place that would prevent it from entering the trap. Maintain a foliage-free space of 12 to 18 inches around the trap. Traps should not be hung below the foliage canopy (Fig. 4).



**CORRECT  
PROPER HEIGHT**



**INCORRECT  
PLACED TOO LOW**

**FIGURE 4.**

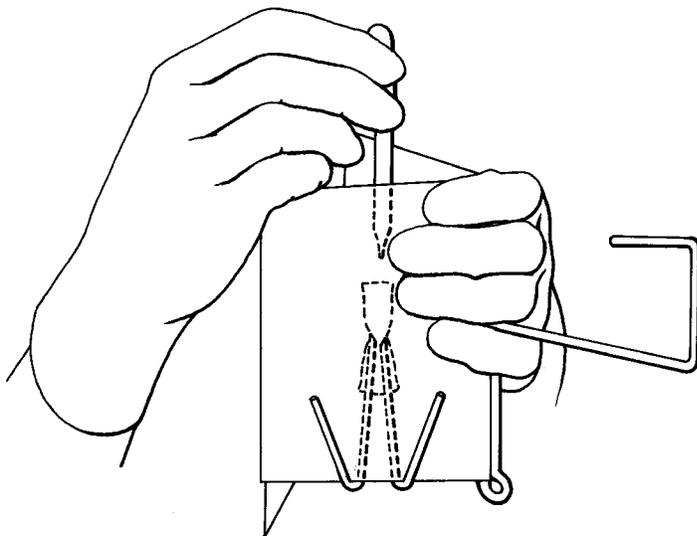
**TRAP INSPECTION AND SERVICING:** When inspecting traps, the following steps should be taken:

1. Remove the trap from the tree.
2. Pull out insert and examine entire area of stickum.
3. Remove leaves and debris from stickum as flies could be beneath these objects. Be certain that the sticky surface is not rendered less effective by dust or debris. The stickum must remain optimally sticky to capture flies.
4. If no flies are found, replace insert, date trap, bait as appropriate, and replace in tree.
5. Change inserts every month or more often as needed. Always change the insert when relocating the trap. Mark new inserts with the trap number, placement date, and "ML."
6. Wicks should be changed every two months or when relocated. Since water (moisture) can physically force the lure out of the wicks and contaminate the traps, wicks which become wet from rain, sprinklers, etc. should be changed.
7. Trap bodies eventually lose their shape, become filled with trap servicing data, or otherwise deteriorate. When this occurs, they should be replaced.

Cue-lure is to be kept in a darkened bottle. A calibrated medicine dropper is recommended for application of the lure to each end of the wick. In accordance with the SLN, the wick is initially baited with 5 ml. of lure. One half of the lure is applied to each end of the wick. Rebaiting of the wick is not recommended. This lure contains dibrom to ensure that flies are incapacitated and held in the stickum. The following illustration shows correct positioning of the trap for baiting (Fig. 5). All baiting of wicks with lure containing dibrom should be done at a work station where appropriate safety equipment is available for use.

The following baiting procedure for Oriental fruit fly (OF) and melon fly (ML) traps has been established so that the actual application is performed in the safest possible manner and to minimize the possibility of baiting one trap type with the wrong lure.

1. **DO NOT BAIT IN THE FIELD.**
2. Prior to baiting, determine the number of new OF and ML traps needed for the day. Assemble the required number of Jackson traps (plus an additional 10%). Open a trap body, place an unopened insert into the body to keep it open and install a wick holder and wick.
3. Prior to any lure being opened, place the appropriate 1% dibrom concentration labels on the Jackson trap bodies designated to be OF traps. Likewise, place the 5% dibrom concentration labels on the trap bodies soon to be ML traps. **KEEP THESE DIFFERENTLY LABELED, UNBAITED TRAP BODIES SEPARATED!** Place any other required trap labeling on the trap at this time as well.
4. When baiting OF and ML traps, never bait both trap types at the same time in the same area. Either bait one type first and then the other or have two trappers baiting in separate areas.
5. In a well-ventilated area, bait the traps over paper towels or some other disposable, absorbent material in the event of an accidental spill.
6. Always wear rubber gloves and safety goggles when handling the lure/dibrom combination before it has been applied to the wick. After applying the material, rinse your gloves with soap and water before you take them off.
7. After all of the traps are baited, each trapper collects the number of baited traps required to perform all of the placements and/or rebaitings scheduled for that day in their route (plus an additional 10% to cover those traps needing unanticipated rebaiting). These correctly labeled, baited traps are placed into a large plastic bag and closed.
8. Once in the field and at the site of a trap needing baiting, remove the old trap from the tree, inspect the insert and remove the trap hanger. Place the trap hanger onto the new replacement trap, make all required notations on the new trap body and insert, and place the new trap into the host tree.
9. Place the old trap into another plastic bag at the trapping vehicle. Dispose of all old wicks as instructed by the trapping supervisor.



**FIGURE 5.**

#### AVOID CONTAMINATION

Never bait over trapping supplies.

Always bait over absorbent material. It is critical to avoid contamination with this lure. **CONTAMINATED FINGERS TRANSFER LURE. NO LURE CAN BE ALLOWED TO CONTAMINATE THE OUTSIDE OF THE TRAP.**

**COLLECTION AND SUBMISSION OF SAMPLES:** The entire trap insert containing the suspect fly should be collected for supervisory review. Specimens submitted to Sacramento should be cut from the sticky insert and placed in a dry vial for submission. Send the specimen to Sacramento with a Standard Form 65-020, "Pest and Damage Record" (PDR). Be sure the identification slip, and the outside of the package are marked "RUSH." Include the trap number in the "Remarks" section of the PDR Form.

**BAITING INTERVAL:** Replace the old wick with a newly baited wick every two months, or when relocated, throughout the trapping period.

**TRAP RELOCATION:**

Southern California - No trap should exceed six weeks at one location over a 12 month period when suitable host sites are available. When relocation sites are limited, traps can remain longer than six weeks, as long as fruit is available at the trap site.

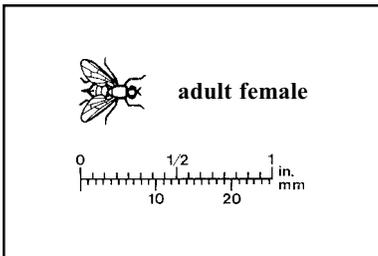
All other areas - Relocate once during the season prior to August 15.

Relocation **MUST** be made when fruit at the trap site is gone. Relocations should provide for moving the trap evenly throughout its assigned area, with a minimum relocation distance of 500 feet.

The trapper should schedule relocation sites in advance. If a desired fruiting host cannot be located, either because of lack of hosts or lateness of the season, then a trap should not be placed or maintained. This means that certain square miles may have fewer traps than the proposed level.



Photo by Jack Clark, University of California, Agriculture and Natural Resources



## MELON FLY

*Bactrocera cucurbitae* (Coquillett)



**PROGRAM:** General Fruit Fly Trapping (Fruit trees and vegetable gardens)

**TYPE OF TRAP:** McPhail Trap and Multilure Trap

The McPhail trap (Fig. 1) is a glass trap with a water reservoir containing dissolved attractant compounds. Flies enter from below through the opening and drown in the solution. The Multilure trap (Fig. 2) is a plastic version of the McPhail trap, which when used like the McPhail trap captures flies in the same manner.



**FIGURE 1. MCPHAIL TRAP**



**FIGURE 2. MULTILURE TRAP**

**ATTRACTANT:** Torula yeast and borax pellets act as a food attractant.

**TRAPPING SEASON:** Southern California - Year-round in urban areas of southern California.

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Trapping Period												

Southern San Francisco Bay Area - April through November. Trapping shall commence on April 1 and end on November 30, subject to host availability.

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Trapping Period												

Other Urban Areas - May through October. Trapping shall commence on May 1 and end on October 31, subject to host availability.

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Trapping Period												

Imperial County - November through May. Trapping shall commence on November 1 and end on May 31.

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Trapping Period												

Coachella Valley - September through June. Trapping shall commence on September 1 and end on June 30.

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Trapping Period												

Mountain and northern counties and rural areas are not to be trapped.

**TRAP DENSITY:** Detection Survey - Southern California - Use five traps per square mile in urban areas (except Orange, Riverside, southern San Luis Obispo, Santa Barbara, and Ventura counties should use five traps per square mile in urban areas and follow the schedule listed for rural residential areas on page MF-3).

Southern San Francisco Bay Area - Use five traps per square mile in urban areas (except Alameda, Contra Costa, San Francisco and Santa Clara counties should use five traps per square mile in urban areas and follow the schedule listed for rural residential areas on page MF-3).

Southern San Joaquin Valley (Madera County and south) - Use three traps per square mile in urban areas. In rural residential areas use an equivalent number of traps per square mile as outlined below.

<u>Residences/Square Mile</u>	<u>Number of Traps</u>
25 - 50	1
51 - 300	2
301 - up (urban)	3

Traps should be placed at a residence. If no host exists at a residence, then use a host tree closest to a residence.

Imperial County - Use three traps per square mile in urban areas.

Coachella Valley - Use three traps per square mile in urban areas.

In Napa, Solano, Sonoma, and Yolo counties - Use two traps per square mile in urban areas. June through October - traps should be placed at garden sites with melon fly traps. At all other times, McPhail traps should be placed on properties separate from all other fruit fly traps.

In Marin, Merced, Sacramento, San Joaquin, Santa Cruz, and Stanislaus counties - Use two traps per square mile in urban areas. In rural residential areas use an equivalent number of traps per square mile as outlined below. June through October - traps should be placed at garden sites with melon fly traps. At all other times, McPhail traps should be placed on properties separate from all other fruit fly traps.

<u>Residences/Square Mile</u>	<u>Number of Traps</u>
25 - 250	1
251 - up (urban)	2

Traps should be placed at a residence. If no host exists at a residence, then use a host tree closest to a residence.

Delimitation Survey - **For *Anastrepha* species, e. g. Mexican fruit fly, Caribbean fruit fly, etc.** - In a delimitation or intensive trapping program, **Multilure** traps are placed over nine square miles, with 80 traps in the core square mile and 40 traps per square mile in the eight square miles surrounding the core. A total of 400 traps is involved (Fig. 3). If a mated female is trapped, increase the core to 160 traps (480 traps total for the nine core square miles). All traps will be baited with the two-component lure of ammonium acetate and putrescine. Trap density within the core square mile is increased within 24 hours. Refer to pages IPMT-2, "Hanging The Trap" and IPMT-4, "Trap Inspection and Servicing" and "Baiting Intervals" for specific procedures on trap deployment, inspection, servicing, and baiting.

**For Non-*Anastrepha* species** - In a delimitation or intensive trapping program, **McPhail** traps are placed over nine square miles, with 80 in the core square mile and 40 traps per square mile in the eight square miles surrounding the core. A total of 400 traps is involved (Fig. 3). If a mated female is trapped, increase the core mile to 160 traps (480 traps total for the nine core square miles). In the central nine square miles use torula yeast pellets or a liquid mixture of Nu-Lure (9%), borax (5%), and water (86%) by weight (Table 1). Nu-Lure has previously been called SIB-7 (Staley's insect bait) or PIB-7 (protein insect bait). Trap density within the core square mile is increased within 24 hours.

For small, isolated residential areas, larger delimitation grids, up to 81 square miles, to encompass the entire residential area may be considered (Fig. 4).

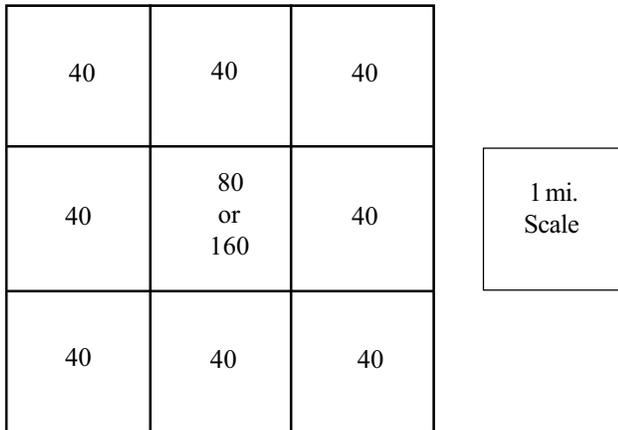
Table 1: Nu-Lure Mixture

Amounts of Material by Weight	Amounts for One Gallon of Mix	Amounts for Five Gallons of Mix
Nu-Lure (9%)	268 ml. (9 fl. oz.)	1,340 ml. (45 fl. oz.)
Borax (5%)	186 g. (6.4 oz.)	930 g. (2 lbs.)
Water (86%)	3,200 ml. (107.5 fl. oz.)	16,000 ml. (17 qts.)

**INSPECTION FREQUENCY:** Detection Survey - Once every seven days with the following exception: those counties operating traps all year will perform servicing once every 14 days from December 1 through February 28.

Delimitation Survey - Servicing is to be conducted daily in the core square mile during the first week. The Nu-Lure or torula yeast mixture should be reused after each servicing and replaced on a weekly basis. Traps in the eight square miles surrounding the core are serviced every two days. All other traps should be checked at least once within the first week.

**STANDARD  
DELIMITATION SURVEY TRAPPING  
TRAPS PER SQUARE MILE**

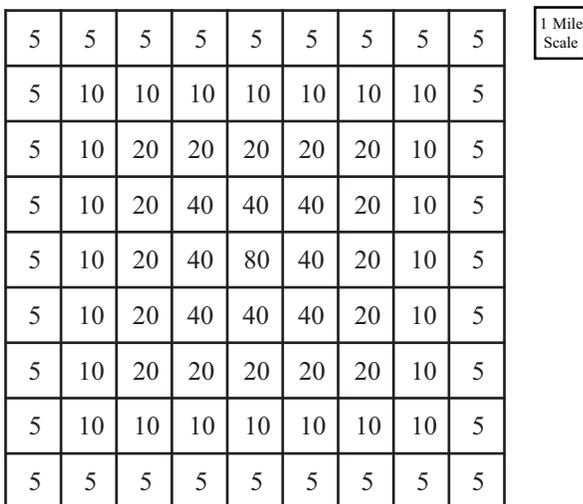


**MULTILURE/MCPHAIL TRAP TOTALS**

Core Area: 1 sq. mile = 80 traps or 160 traps  
 1 mile buffer: 8 sq. miles = 320 traps  
 Total: 9 sq. miles = 400 or 480 traps

**FIGURE 3.**

**ALTERNATE  
DELIMITATION SURVEY TRAPPING  
TRAPS PER SQUARE MILE**



**MULTILURE/MCPHAIL TRAP TOTALS**

Core Area: 1 sq. mile = 80 traps  
 1 mile buffer: 8 sq. miles = 320 traps  
 2 mile buffer: 16 sq. miles = 320 traps  
 3 mile buffer: 24 sq. miles = 240 traps  
 4 mile buffer: 32 sq. miles = 160 traps  
 Total: 81 sq. miles = 1,120 traps

**FIGURE 4.**

**HOSTS:** The selection of the best host at each trap location is the most important phase of an effective detection program. Priority must be given to hosts which have nearly mature fruit as listed in the Host Preference List.

**Carribbean Fruit Fly Host Preference List**  
(with nearly mature or mature fruit and foliage)

<u>Class I Hosts</u> (Exceptional Hosts)	Common guava	Loquat	Strawberry guava	Surinam cherry
<u>Class II Hosts</u> (Good Hosts)	Calamondin	Kumquat	Nectarine	Peach
<u>Class III Hosts</u> (Acceptable Hosts)	Avocado Grapefruit Lime	Mango Papaya Pummelo	Sour orange Sweet orange Tangelo	Tangerine White sapote
<u>Class IV Hosts</u> (Lesser Hosts)	Cherimoya	Persimmon	Pomegranate	

**General Fruit Fly Host Preference List**

Primary hosts are vegetables; fruit trees are secondary hosts.

Cucurbits (melons, squashes, cucumbers, pumpkins, gourds, etc.)  
Tomatoes  
Green beans  
Peppers  
Okra  
Eggplant  
Stone fruits  
Pome fruits  
Tropical fruits  
Citrus

For other *Anastrepha* spp., *Bactrocera* spp., and *Dacus* spp. and fruit flies in general, other fruit trees are acceptable for trapping if none of the hosts for Mexican fruit fly or Carribbean fruit fly are available at the appropriate fruiting stage.

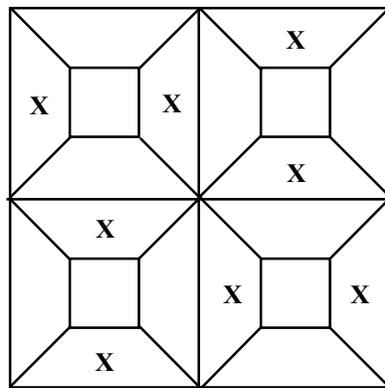
**Mexican Fruit Fly Host Preference List**  
(with nearly mature or mature fruit and foliage)

<u>Class I Hosts</u> (Exceptional Hosts)	Common guava Grapefruit Mango	Nectarine Peach Pummelo	Sour orange Strawberry guava Sweet orange	Sweet lime Tangerine White sapote
<u>Class II Hosts</u> (Good Hosts)	Apple Avocado Citron	Coffee Loquat Papaya	Pear Persimmon Pineapple guava	Tangelo
<u>Class III Hosts</u> (Acceptable Hosts)	Cherimoya	Lemon	Pomegranate	Quince

**SELECTION OF TRAPPING SITES:** Selection of a trap site will depend on two main criteria: a suitable host, and uniform trap distribution throughout the assigned area. A suitable host can be defined as one of the listed host plants with foliage and nearly mature fruit, and one that is suitable for trap placement as described under "Hanging the Trap." However, shade and shelter, particularly in hot weather, also influence host selection by fruit flies. Thus, a densely foliated host tree without fruit may be preferable to a fruiting, sparsely foliated host tree. However, a well foliated, fruiting host tree will always be the tree of first choice.

The two McPhail/Multilure traps per square mile deployed for general fruit fly detection must be placed near primary hosts in the general fruit fly host preference list. Traps deployed in or near gardens for general fruit fly detection can utilize non-fruit trees to keep the trap as close as possible to the garden.

In reference to the two the traps assigned to gardens, maintain a uniform trap distribution. This can be achieved by alternating trap placement from the north/south subgrids in one mile to the east/west subgrid in the adjoining mile. Repeat this pattern over the entire trapping area (Fig. 5). However, host availability will always determine trap location



**FIGURE 5.**

**HANGING THE TRAP:** When installing the traps, add water to a level just below the inside lip of the trap so that minor tilting of the trap will not cause spillage. (NOTE: This is important. A splash of solution on the glass surface outside the reservoir will dry, leaving a protein residue. Dried proteins outside of the reservoir are arrestants and will prevent flies from entering the trap and drowning in the solution). Add three to six bait pellets. These pellets are affected by temperature, humidity, and the amount of water in the trap. The use of six pellets may cause a congealing of the solution. If this occurs, the number of pellets should be reduced by one pellet per servicing until the solution remains fluid between servicing. Place a date calendar on the trap hanger. .

Place the trap in the warmest part of the tree in open shade (not in full sunlight at any time). During extremely hot weather, traps may need to be moved to other areas of the tree. Traps should be placed in the upper 1/2 to 1/3 of the tree canopy on a strong branch, 1/2 to 2/3 the distance from the trunk to the outer edge of the foliage. Lower levels are acceptable only if it is impossible to find a desired spot higher in the tree. Before placing a trap at lower levels in a tree, safety to children and the security of the trap must be considered. It should not be placed in dense foliage that may block the trap entrance or give the fly a resting place that would prevent it from entering the trap.

Maintain a foliage-free space of 12 to 18 inches around the trap, but be sure foliage and ripening fruit surround the trap beyond that distance, particularly to the bottom and sides. Traps should never be hung below the foliage canopy, nor should they be closer than four feet to the ground.

**TRAP INSPECTION AND SERVICING:** McPhail Trap - Remove the trap from the tree. Gently swish the contents to catch flies that are alive and clinging to the inside of the glass in the air space above the water solution. Do this over the straining pan to catch spillage. Remove the stopper while swishing and pour the contents of the trap through the straining pan.

Multilure Trap - Remove the trap from the tree. Remove the trap bottom and pour the contents into the straining pan. Inspection for target flies is then done as outlined below.

The bottom of the straining pan has been perforated with numerous holes (use a #50 drill bit and a white plastic pan). After the liquid has passed through, float the flies by submerging the bottom of the perforated pan in a slightly larger pan of water. Softened and rolled wings, even if detached from fly bodies, will straighten out and readily be seen on the surface of the water. Avoid spilling bait since flies might be attracted to such material instead of entering traps. Keep the trapping rig clean. Contamination of the trap may occur while on a dirty rig. Clean contaminated traps before use. Carry away old bait and wash water in a suitable container (five gallon buckets) for proper disposal. Refill the trap, add new pellets and redeploy. Keep the inside and outside of the traps clean. The transparency of the McPhail trap and the upper portion of the Multilure trap is important in luring flies into the trap.

**CARE AND MAINTENANCE OF TRAPPING EQUIPMENT:** McPhail Trap - The McPhail traps should be soaked in a solution of trisodium phosphate "TSP" for five to six hours and brushed clean. "Lime Away" can be used to clean any remaining calcium deposits. Use gloves and eye protection when using these products. A large container such as a 50-gallon drum would be ideal for soaking traps. Cleaning the traps before winter storage ensures a clean trap in the spring during busy trap deployment and will prevent the annual compounding of mineral deposits on the glass. For programs on a year-round schedule, traps should be rotated out-of-service for cleaning. (NOTE: muriatic acid can be used for hard-to-clean traps but proper protective equipment such as a respirator, goggles, and gloves should be worn. Muriatic acid can be purchased from swimming pool supply outlets and diluted 20 to one with water. Traps should be soaked in a plastic drum for 30 minutes. Rinse and brush immediately after removal to reduce corrosion of the metal hanger wire. Save all neoprene stoppers.) The McPhail sleds should be treated once a year with a stain or water seal and stored out of the weather when not in use.

Multilure Trap - Clean traps thoroughly with plain water. A water solution with a slightly acid pH will help prevent mineral deposits on the trap. At the end of the season traps should be cleaned, dried and carefully stacked for storage.

**COLLECTION AND SUBMISSION OF SAMPLES:** Specimens collected from McPhail traps should be placed in an alcohol vial for submission to Sacramento (see instructions for shipping on page xii). If two or more insects are detected in the same McPhail trap, they should be submitted in separate vials. The specimens need to be in alcohol to prevent rotting. If they are placed singly in vials, the dye can be detected in the alcohol. Non-sterile flies will not be confused with sterile flies in this manner. Only one identification slip is necessary for specimens from the same trap. After being brought to the attention of the county entomologist and/or supervisor, the specimens are to be sent to Sacramento for identification. Use a Standard Form 65-020, "Pest and Damage Record" (PDR). Mark "RUSH" on both the form and the outside of the package. Include the trap number in the "Remarks" section of the PDR Form.

**BAITING INTERVAL:** For detection trapping new bait pellets and water are to be added to the trap at every servicing.

**TRAP RELOCATION:**

**FOR FRUIT TREES** - Relocations **MUST** be made when fruit at the trap site is gone. No trap should exceed six weeks at one location over a 12 month period when suitable host sites are available. When relocation sites are limited, traps can remain longer than six weeks, as long as fruit is available at the trap site. Relocations should provide for moving the trap evenly throughout its assigned area, with a minimum relocation distance of 500 feet.

For Southern California and the Southern San Francisco Bay Area, a minimum of 100 traps sites per square mile are to be identified. No less than 80 of these sites shall be used each year. The remaining 20 sites should be factored into the relocation plan for the next year. Newly identified sites may be added at any time.

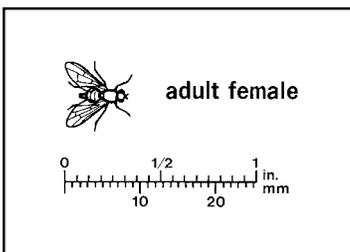
For the Other Urban Areas, a minimum of 50 trap sites per square mile are to be identified. No less than 25 of these sites shall be used each year. In the second year, utilize 60 percent of the trap sites not used, and the remaining 40 percent in the third year. Combine the new trap sites with some of the original 25 trap sites to assure use of a total of 25 annually. Newly identified sites may be included at any time.

For efficient and effective trapping, the trapper should schedule relocation in advance. If a desired fruiting host tree cannot be located, either because of lack of hosts or lateness of the season, then a trap should not be placed or maintained. This means that certain square miles may have fewer traps than the proposed level.

**FOR VEGETABLE GARDENS** - McPhail traps deployed at garden sites with melon fly traps will relocate on the melon fly trap relocation schedule. Prior to the deployment of and subsequent to the removal of melon fly traps, these McPhail traps will relocate on the same schedule as the McPhail traps deployed in fruit trees (six weeks).



Photo courtesy of Florida DPI

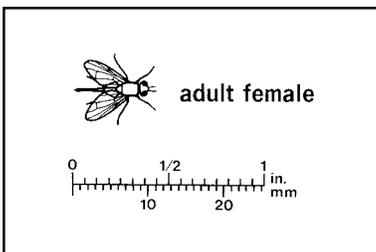


**CARIBBEAN FRUIT FLY**  
*Anastrepha suspensa* (Loew)





Photo by Jack Clark, University of California Agriculture and Natural Resources

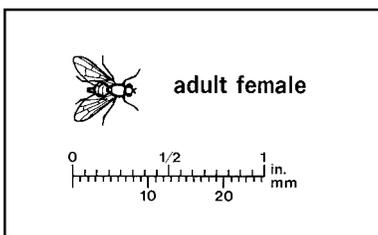


**MEXICAN FRUIT FLY**  
*Anastrepha ludens* (Loew)





Photo courtesy of Florida DPI

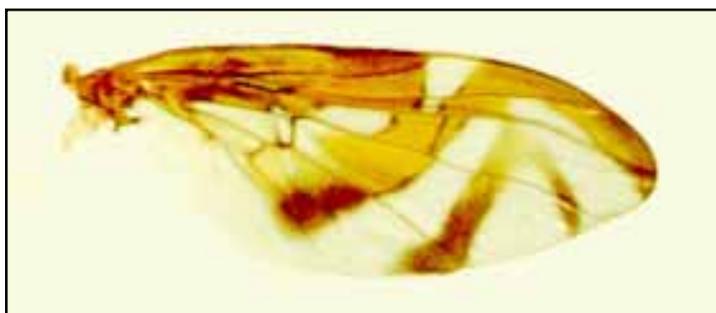


**West Indian Fruit Fly**  
*Anastrepha obliqua* (Macquart)

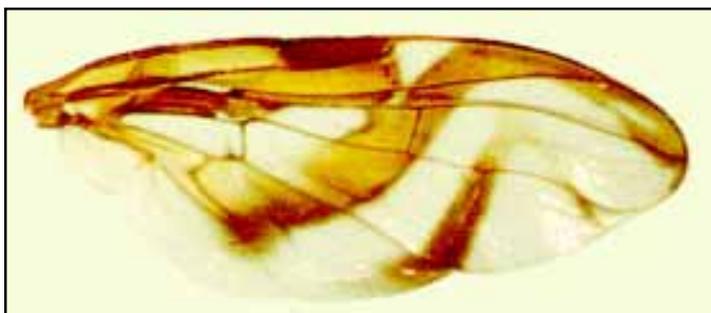


# Wing Patterns of Selected *Anastrepha* Species

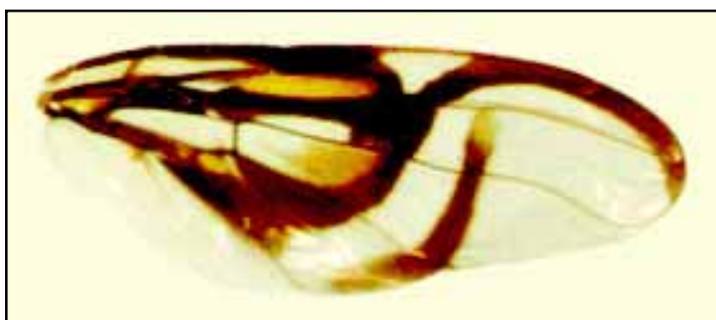
(Photos by A. J. Gilbert)



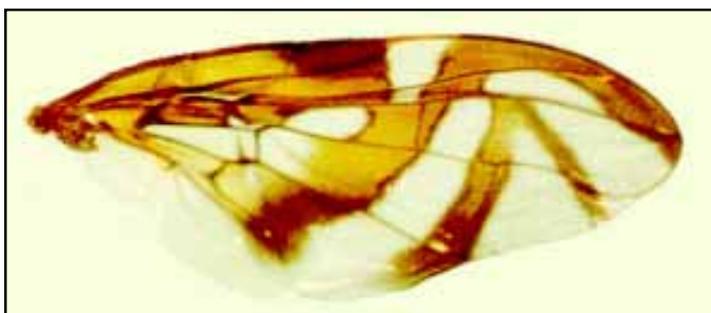
*Anastrepha fraterculus* (Wiedemann)  
South American fruit fly



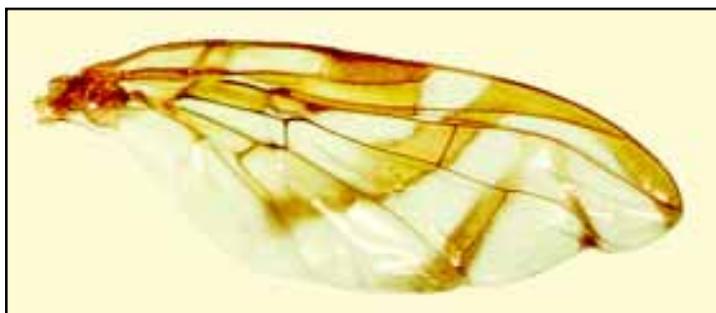
*Anastrepha striata* Schiner  
Striped fruit fly



*Anastrepha serpentina* (Wiedemann)  
Sapote fruit fly



*Anastrepha obliqua* (Macquart)  
West Indian fruit fly

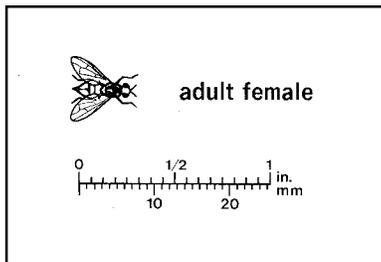


*Anastrepha ludens* (Loew)  
Mexican fruit fly





Photo by Paul Zborowski ©

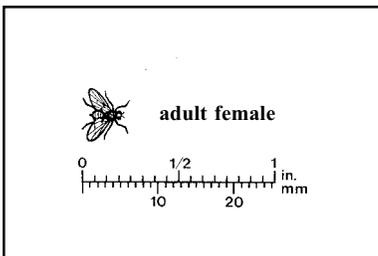


**Solanum Fruit Fly**  
*Bactrocera latifrons* (Hendel)





Photo courtesy of Dr. Shradanand Permalloo, Entomology Division, Ministry of Agriculture, Food Technology & Natural Resources, Reduit, Mauritius



**Tomato Fruit Fly**  
*Neoceratitis cyanescens* (Bezzi)



**PROGRAM:** *Bactrocera* spp. (guava, oriental and peach fruit flies) Trapping

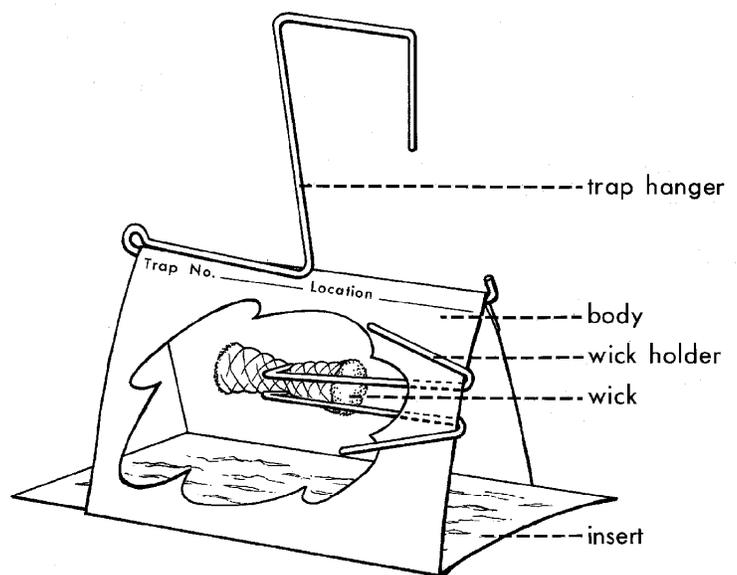
**TYPE OF TRAP:** Jackson Trap (In all State operated programs the Champ™ trap will replace the Jackson trap)

The delta-shaped Jackson trap is made of plastic-coated cardboard (Fig. 1). Lure is placed on a cotton roll wick supported inside the trap by a wire wick holder. A sticky insert on the bottom captures flies.

The Jackson trap consists of five parts: trap body, insert, wick holder, wick, and trap hanger (Fig. 2). Trap hangers are reusable and should be saved.



**FIGURE 1. JACKSON TRAP**



**FIGURE 2. JACKSON TRAP**

**ATTRACTANTS:** Methyl eugenol (1% dibrom is added to the lure to stun the flies). This lure acts primarily as a male attractant. When there is an absence of males, females may enter the trap. Signal Green pigment has been added as an identifying color.

Color variation in the dibrom/lure mixture is due to the reaction of the free bromine radical. Dibrom varies in color from light brown to dark brown. The color of the material does not interfere with its effectiveness. Shake well before dispensing any lure. Improper storage and handling can cause the dibrom to break down. Users should order only as much material as needed during the year. Keep the dibrom/lure mixture in closed, darkened bottles in a cool place.

METHYL EUGENOL

Trap Component	Stimulus	Response
Wick	Methyl eugenol	Elicits strong attraction and feeding response by male Oriental fruit flies.

Special instructions for the use of methyl eugenol containing dibrom:

1. A copy of the Special Local Need (SLN) registration must be carried by each trapper using the lure (page xxiii).
2. The SLN instructions must be followed.
3. Pesticide labels must be carried by each trapper.
4. The following label should be attached to all service containers which contain dibrom as an addition to the lure. Complete the label by adding a local phone number where emergency calls can be directed.

**DANGER**

NALED + METHYL EUGENOL

Date Pkgd.: \_\_\_\_\_  
CA Dept. of Food & Agriculture  
3288 Meadowview Road  
Sacramento, CA 95832  
(916) 445-6214  
IN CASE OF AN EMERGENCY, NOTIFY:

5. The following additional label must be placed on the trap. The current phone number for the Poison Control Center is 1-800-876-4766.

Cotton wick contains 5 ml of 1% naled (an organophosphorous insecticide), and methyl-eugenol (an insect attractant).

May be irritating to eyes and skin. If in eyes, immediately flush with water. Wash skin with soap and water. Contact a physician if irritation persists.

For additional information, contact \ Para mayor información llame al:

California Poison Control System \ El Sistema de California Para El Control de Envenenamiento: 1-800-876-4766

La mecha de algodón contiene 5 ml de 1% naled (un pesticide organofosforado) y methyl-eugenol (un atrayente de insectos).

Puede causar irritación en los ojos y la piel. En caso de contacto lávese los ojos inmediatamente con agua. Lávese su piel con agua y jabón. Si la irritación persiste comuníquese con un médico.

**TRAPPING SEASON:** Southern California - Year-round subject to host availability.

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Trapping Period												

Imperial County - November through May. Trapping shall commence on November 1 and end on May 31.

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Trapping Period												

Coachella Valley - September through June. Trapping shall commence on September 1 and end on June 30.

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Trapping Period												

Southern San Francisco Bay Area - April through November. Trapping shall commence on April 1 and end on November 30, subject to host availability.

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Trapping Period												

Other Urban Areas - May through October. Trapping shall commence on May 1 and end on October 31, subject to host availability.

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Trapping Period												

Mountain and northern counties and rural areas are not to be trapped.

**TRAP DENSITY:** Detection Survey - Southern California, Southern San Francisco Bay Area and Other Urban Areas of Coachella and Imperial Valleys - Use five traps per square mile in urban and rural residential areas of 300 or more homes per square mile (except Alameda, Contra Costa, Orange, Riverside, San Francisco, southern San Luis Obispo, Santa Barbara, Santa Clara, and Ventura counties should use five traps per square mile in urban areas and follow the schedule listed for rural residential areas on page MF-3).

Other Urban Areas - Use two traps per square mile in urban and rural residential areas of 300 or more homes per square mile, with the following exceptions: Mendocino, Lake, Amador and Calaveras counties use one trap per square mile. In Fresno, Kern, Kings, Madera, Marin, Merced, Sacramento, northern San Luis Obispo, Santa Cruz, San Joaquin, Stanislaus, Tulare and Yuba counties use two traps per square mile in urban areas. In rural residential areas use an equivalent number of traps per square mile as outlined below.

<u>Residences/Square Mile</u>	<u>Number of Traps</u>
25 - 250	1
251 - up (urban)	2

Traps should be placed at a residence. If no host exists at a residence, then use a host tree closest to a residence.

Delimitation Survey - When an Oriental fruit fly is trapped, trap densities increase to 25 Jackson traps baited with methyl eugenol plus dibrom and 25 McPhail traps baited with either torula yeast or Nu-Lure in the square miles around the find. (See Table 1, MP-5.) Place five Jackson traps per square mile baited with methyl eugenol plus dibrom in the remaining 80 square miles of the 9x9 mile area (81 square miles) (Fig. 3). A total of 425 Jackson traps plus 25 McPhail traps are required. Trap densities within the core square mile are increased within 24 hours.

**INSPECTION FREQUENCY:** Detection Survey - once every two weeks.

Delimitation Survey - Servicing is to be conducted daily in the core square mile during the first week. Traps in the eight square miles surrounding the core are serviced every two days. All other traps should be checked at least once within the first week. The Nu-lure mixture should be reused after each servicing and replaced on a weekly basis.

**ORIENTAL FRUIT FLY DELIMITATION  
TRAPS PER SQUARE MILE**

5	5	5	5	5	5	5	5	5	1 Mile Scale
5	5	5	5	5	5	5	5	5	
5	5	5	5	5	5	5	5	5	
5	5	5	5	5	5	5	5	5	
5	5	5	5	25 25	5	5	5	5	
5	5	5	5	5	5	5	5	5	
5	5	5	5	5	5	5	5	5	
5	5	5	5	5	5	5	5	5	
5	5	5	5	5	5	5	5	5	
5	5	5	5	5	5	5	5	5	

**JACKSON TRAP TOTALS**

Core Area:	1 sq. mile	=	25 traps
1 mile buffer:	8 sq. miles	=	40 traps
2 mile buffer:	16 sq. miles	=	80 traps
3 mile buffer:	24 sq. miles	=	120 traps
4 mile buffer:	32 sq. miles	=	160 traps
Total:	81 sq. miles	=	425 traps

**FIGURE 3.**

**HOSTS:** Tropical fruits (i.e., guava, avocado, Kaffir plum, Catalina cherry, etc.), stone fruits, pome fruits, citrus, and tomato. Except for delimitation trapping, Oriental fruit fly traps will be piggy-backed with Medfly traps and the host selected will depend on what is available on the property with the Medfly trap. This approach can be used because the lure, methyl eugenol, is so highly attractive.

**SELECTION OF TRAPPING SITES:** Selection of a trap site will depend on two main criteria: a suitable host, and uniform trap distribution throughout the assigned area. A suitable host can be defined as one of the listed host plants with ripe fruit and foliage, and one that is suitable for trap placement as described under "Hanging the Trap." However, shade and shelter, particularly in hot weather, also influence host selection by fruit flies. Thus, a tree with good foliage near (within 20 feet) a sparsely foliated host tree with fruit may be a preferable site to hang a trap. However, a well foliated, fruiting host tree will always be the tree of first choice. Do not use conifers.

**HANGING THE TRAP:** Assemble the trap by first writing the trap number and date of deployment (including the year) on both the trap body and sticky insert. The trap body is then opened; the bottom is pushed upward and firm pressure is applied laterally. **THIS IS IMPORTANT!** When pressure is released, the trap bottom will remain flat. The sticky insert is slid into place. It will bow up or down slightly and fit tightly, if properly done (Fig. 2).

Place the trap in the warmest part of the tree in open shade (**not in full sunlight at any time**). During extremely hot weather, traps may need to be moved to other areas of the tree. Traps should be placed in the upper 1/2 to 1/3 of the tree canopy, 1/2 to 2/3 the distance from the trunk to the outer edge of the foliage. Lower levels are acceptable only if it is impossible to find a desired spot higher in the tree. Before placing a trap at lower levels in a tree, safety to children and the security of the trap must be considered.

It should not be placed in dense foliage that may block the trap entrance or give the fly a resting place that would prevent it from entering the trap.

Maintain a foliage-free space of 12 to 18 inches around the trap, but be sure foliage and ripening fruit surround the trap beyond that distance, particularly to the bottom and sides. Traps should never be hung below the foliage canopy, nor should they be closer than four feet to the ground (Fig. 4).



**CORRECT  
PROPER HEIGHT**



**INCORRECT  
PLACED TOO LOW**

**FIGURE 4.**

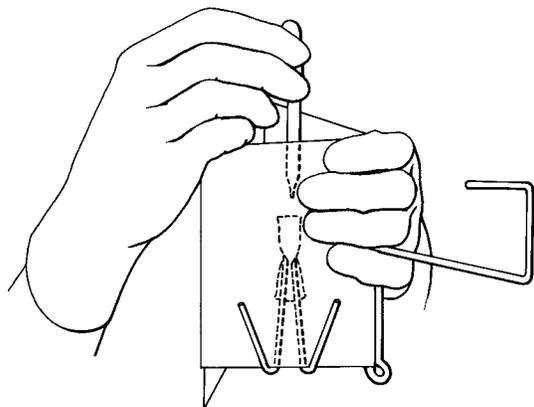
**TRAP INSPECTION AND SERVICING:** When inspecting the traps, the following steps should be taken:

1. Remove the trap from the tree.
2. Pull out insert and examine entire area of stickum.
3. Remove leaves and debris from stickum as flies could be beneath these objects. Be certain that the sticky surface is not rendered less effective by dust or debris. The stickum must remain optimally sticky to capture flies.
4. If no flies are found, replace insert, date trap, bait as appropriate, and replace in tree.
5. Change inserts every month or more often as needed. Always change the insert when relocating the trap. Mark new inserts with the trap number, date, and "OF".
6. As a general rule, wicks should be changed about every four to 12 weeks. Since water (moisture) can physically force the lure out of the wicks and contaminate the trap, wicks which become wet from rain, sprinklers, etc., should be changed.
7. Do not pre-bait wicks until the day they are needed.
8. Trap bodies eventually lose their shape, become filled with trap servicing data, or otherwise deteriorate. When this occurs, they should be replaced.

Methyl eugenol lure is to be kept in a darkened bottle. A calibrated medicine dropper is recommended for application of the lure to the wick. In accordance with the SLN, the wick is initially baited with 5 ml. of lure. One half of the lure is applied to each end of the wick. This lure contains dibrom to ensure that flies are incapacitated and held in the stickum. The following illustration shows correct positioning of the trap for baiting (Fig. 5). All baiting of wicks with lure containing dibrom should be done at a work station where appropriate safety equipment is available for use.

The following baiting procedure for Oriental fruit fly (OF) and melon fly (ML) traps has been established so that the actual application is performed in the safest possible manner and to minimize the possibility of baiting one trap type with the wrong lure.

1. **DO NOT BAIT IN THE FIELD.**
2. Prior to baiting, determine the number of new OF and ML traps needed for the day. Assemble the required number of Jackson traps (plus an additional 10%). Open a trap body, place an unopened insert into the body to keep it open and install a wick holder and wick.
3. Prior to any lure being opened, place the appropriate 1% dibrom concentration labels on the Jackson trap bodies designated to be OF traps. Likewise, place the 5% dibrom concentration labels on the trap bodies soon to be ML traps. **KEEP THESE DIFFERENTLY LABELED, AS-YET-UNBAITED TRAP BODIES SEPARATED!** Place any other required trap labeling on the trap at this time as well.
4. When baiting OF and ML traps, never bait both trap types at the same time in the same area. Either bait one type first and then the other or have two trappers baiting in separate areas.
5. In a well-ventilated area, bait the traps over paper towels or some other disposable, absorbent material in the event of an accidental spill.
6. Always wear rubber gloves and safety goggles when handling the lure/dibrom combination before it has been applied to the wick. After applying the material, rinse your gloves with soap and water before you take them off.
7. After all of the traps are baited, each trapper collects the number of baited traps required to perform all of the placements and/or rebaitings scheduled for that day in their route (plus an additional 10% to cover those traps needing unanticipated rebaiting). These correctly labeled, baited traps are placed into a large plastic bag and closed.
8. Once in the field and at the site of a trap needing baiting, remove the old trap from the tree, inspect the insert and remove the trap hanger. Place the trap hanger onto the new replacement trap, make all required notations on the new trap body and insert, and place the new trap into the host tree.
9. Place the old trap into another plastic bag at the trapping vehicle. Dispose of all old wicks as instructed by the trapping supervisor.



**FIGURE 5.**

#### AVOID CONTAMINATION

Never bait over trapping supplies.

Always bait over absorbent material. It is critical to avoid contamination with this lure. CONTAMINATED FINGERS TRANSFER LURE. NO LURE CAN BE ALLOWED TO CONTAMINATE THE OUTSIDE OF THE TRAP.

**COLLECTION AND SUBMISSION OF SAMPLES:** The entire trap insert containing the suspect fly should be collected for supervisory review. Specimens submitted to Sacramento should be cut from the sticky insert and placed in a dry vial for submission. Send the specimen to Sacramento with a Standard Form 65-020, "Pest and Damage Record" (PDR). Be sure the identification slip and the outside of the package are marked "RUSH." Include the trap number in the "Remarks" section of the PDR Form.

**BAITING INTERVAL:** Since evaporation of the lure is temperature dependent, the rebaiting schedule will depend upon the weather. Some guidelines are given below; however, trapping supervisors will have to be alert to the possibility that their particular situation may require different schedules.

Winter: eight to twelve weeks

Cool Summer or Spring Conditions: six to eight weeks

Hot Summer: four weeks

**TRAP RELOCATION:** Relocations **MUST** be made when fruit at the trap site is gone. No trap should exceed six weeks at one location over a 12 month period when suitable host sites are available. When relocation sites are limited, traps can remain longer than six weeks, as long as fruit is available at the trap site. Relocations should provide for moving the trap evenly throughout its assigned area, with a minimum relocation distance of 500 feet. In areas of one trap per square mile, the trap must be relocated throughout the mile.

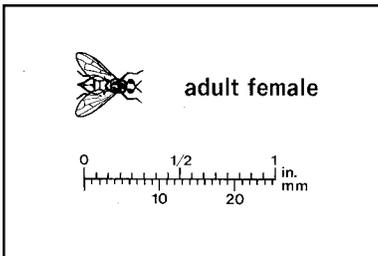
For Southern California and the Southern San Francisco Bay Area, a minimum of 100 traps sites per square mile are to be identified. No less than 80 of these sites shall be used each year. The remaining 20 sites should be factored into the relocation plan for the next year. Newly identified sites may be added at any time.

For the Other Urban Areas, a minimum of 50 trap sites per square mile are to be identified. No less than 25 of these sites shall be used each year. In the second year, utilize 60 percent of the trap sites not used, and the remaining 40 percent in the third year. Combine the new trap sites with some of the original 25 trap sites to assure use of a total of 25 annually. Newly identified sites may be included at any time.

For efficient and effective trapping, the trapper should schedule relocation in advance. If a desired fruiting host tree cannot be located, either because of lack of hosts or lateness of the season, then a trap should not be placed or maintained. This means that certain square miles may have fewer traps than the proposed level.



Photo by Jack Clark, University of California Agriculture and Natural Resources



## **ORIENTAL FRUIT FLY**

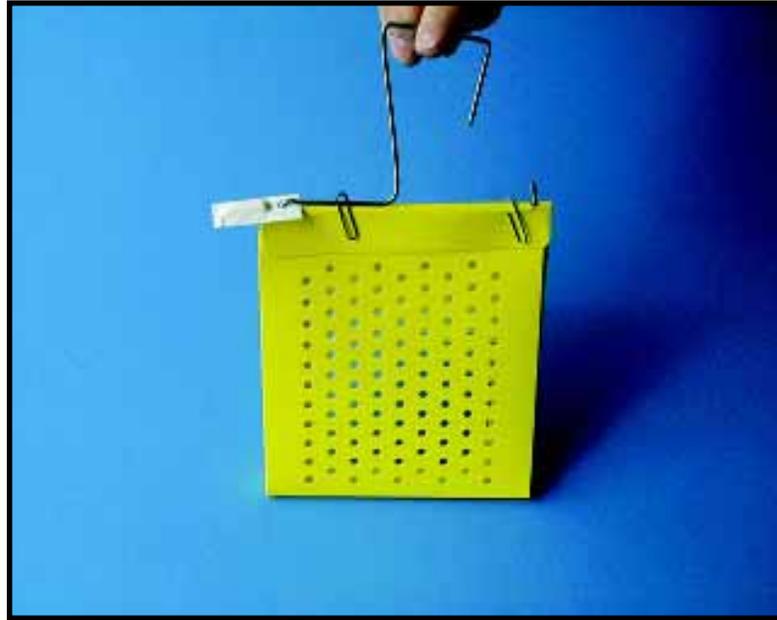
*Bactrocera dorsalis* (Hendel)



**PROGRAM:** Olive Fruit Fly Trapping (OLFF)

**TYPE OF TRAP:** ChamP™

The ChamP™ trap (Fig.1) is a hollow, yellow panel trap with two perforated sticky sides. When folded, the trap is rectangular in shape (7" long, 6" wide), resembling a large tea bag. A food attractant is placed in the center of the trap and is dispersed through the holes in the side panels. The male sex attractant (Spiroketal) is attached to the outside top of the trap. Paper clips are used to hold the top fold in place and secure the trap hanger.



**FIGURE 1. - CHAMP™ TRAP**

**ATTRACTANTS:** The ChamP™ trap utilizes three attractive components (see table below).

Trap Component	Stimulus	Response
Food packet	Ammonium Carbonates	Feeding
Pheromone capsule	OLFF lure (Spiroketal)	Male sex attractant
Yellow trap body	Foliar mimic	Visual

To activate attractants: Pheromone dispenser must be punctured with a single pinhole (1 mm in diameter or less) . Two types of food attractant packets are available. One contains ammonium carbonate and is activated by peeling off the clear plastic covering to expose the membrane underneath. The second type contains ammonium bicarbonate and must be punctured at the top with 2-3 pinholes before being placed inside the ChamP™ trap.

**TRAPPING SEASON:** Urban Areas - Southern California, year-round, subject to host availability.

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Trapping Period												

All other urban areas, April through October. In commercial plantings, traps should be in place by April 1 and be removed when the harvest of canning olives is complete. Those deployed around olive packing facilities should be in place throughout the time that raw olives are stored on the premises.

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Trapping Period												

**TRAP DENSITY:** Detection Survey in Designated Urban Areas – Use five traps per square mile. Trapping to be conducted in those counties as approved by the CDFA district entomologist. In commercial producing olive orchards, use one trap per 40 acres, or one trap per block if planting is less than 40 acres.

Detection Survey Around Commercial Olive Packing Houses - Place one trap in each quadrant around the facility only if olive trees are available. No relocation is necessary.

Delimitation Survey – Within 24 hours of the initial find, place 40 traps in host trees in a one-square-mile area surrounding the initial find. Place 25 traps per square mile in host trees in surrounding eight square miles.

**STANDARD DELIMITATION SURVEY TRAPPING  
TRAPS PER SQUARE MILE**

25	25	25
25	40	25
25	25	25



**CHAMP™ TRAP TOTALS**

Core Area: 1 sq. mile = 40 traps  
 1 mile buffer 8 sq. miles = 200 traps  
 Total: 9 sq. miles = 240 traps

**FIGURE 2.**

**INSPECTION FREQUENCY:** Detection Survey in Urban Areas - Inspect traps every three weeks.

Delimitation Survey - During the first week, place the core traps, check them twice and place buffer traps; thereafter, inspect all traps on a weekly schedule.

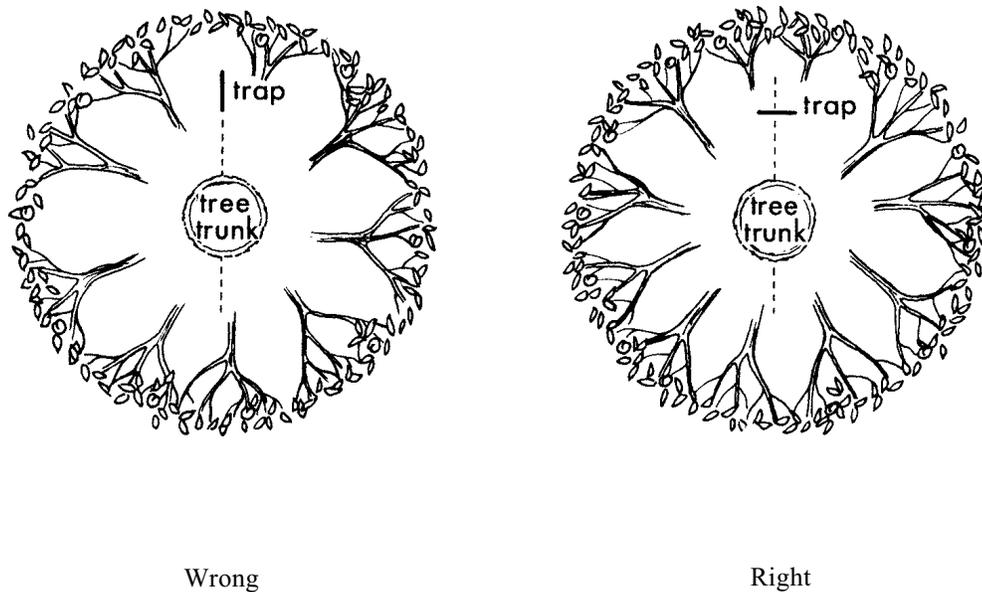
Detection Survey in Production Olive Orchards and Around Packing Facilities - Inspect traps every two weeks.

**HOST:** Olive

**SELECTION OF TRAPPING SITES:** The preferred trap site is a large, well foliated olive tree with fruit. Locations with multiple hosts are best. Small trees and those with scant or highly pruned foliage should be avoided. Fruited trees should be given preference over those without fruit. Fruitless hosts should only be used if no other fruited hosts are present within the subgrid. Avoid dusty trees. In commercial orchards, traps should be deployed 2-3 rows in from the edge of the planting. Edges of roads within the orchards should also be avoided if vehicular travel creates dusty conditions during the trapping season.

**HANGING THE TRAP:** Fold and bait the trap as per the ChamP™ trap instruction sheet. Traps should be placed (if possible) at mid-canopy and positioned parallel to the tree trunk (Fig. 3), 20 to 40 inches in from the outermost foliage. A foliage-free space of at least ten inches should be maintained around the sides and below the trap. Generally, the greater the foliage-free space, the better, as the trap color will be visible to a larger number of flies. In the spring, fall and winter months, traps should be placed in the warmest part of the tree, usually on the southwest side. Traps should be relocated to a cooler portion of the tree (north side) during the hot summer months. Use the prevailing wind to disperse the food and pheromone odors into the trapped tree and any nearby olive trees.

**FIGURE 3. TRAP POSITION WITHIN THE TREE AS SEEN FROM ABOVE**



**TRAP INSPECTION AND SERVICING:** Replace the ChamP™ trap every six weeks or more frequently if the sticky surfaces are excessively dirty. Write the trap number and deployment date on the top fold at the time of deployment. Also, date each lure when first placed in the field. Inspect traps carefully as target flies may be easily concealed by other trapped insects and debris or may be difficult to recognize because distinguishing features such as wing patterns and body coloration may be obscured by the adhesive. Since the ChamP™ trap is equivalent to a Jackson trap insert, it must be replaced whenever the trap is relocated. The Spiroketal capsule is to be replaced every four months, the food bait packet, every two weeks.

**COLLECTION AND SUBMISSION OF SAMPLES:** When collecting samples for identification, the following steps should be taken:

1. Remove the paper clips, unfold the trap and remove the trap hanger and attractants. Invert the trap so that the sticky sides are facing inward, but not touching. Refold the top flap and hold it in place with a paper clip. This will secure the trap in an inside-out position and prevent damage to any insects caught in the adhesive.
2. Place the trap in a #4 paper bag. Staple the Standard Form 65-020, "Pest and Damage Record" (PDR) or equivalent "Project Submission Form" to the outside of the bag. Specimens submitted to Sacramento should be cut from the sticky insert and placed in a dry vial for submission. Be sure the identification slip and the outside of the package are marked "Rush." Include the trap number in the "Remarks" section of the PDR Form.

**BAITING INTERVAL:** Replace the trap a minimum of once every six weeks. The pheromone capsule is attractive for up to four months; the food lure packet for two weeks.

**TRAP RELOCATION:** Urban - Relocate every six weeks to a new site at least 500 feet away. When relocation sites are limited, traps can remain longer than six weeks as long as fruit is available at the trap site. Relocations should provide for moving the trap throughout its assigned area during the course of the trapping season.

In production orchards, relocate every six weeks. Relocations should be designed so that all trees in the orchard fall within the maximum attractive distance of the pheromone plume (200 meters) sometime during the trapping season.

## CHAMP™ TRAP ASSEMBLY INSTRUCTIONS



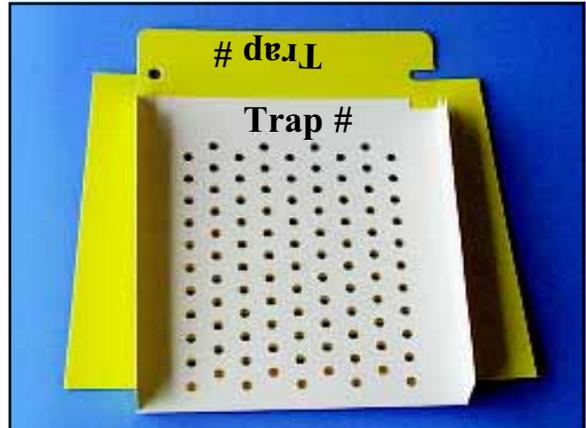
1. Open the food packet by either peeling off the plastic layer or by puncturing the packet three or four times with a pin. Check to see which type of food packet is being used. Be sure the perforated area of the peel-off packet is exposed.



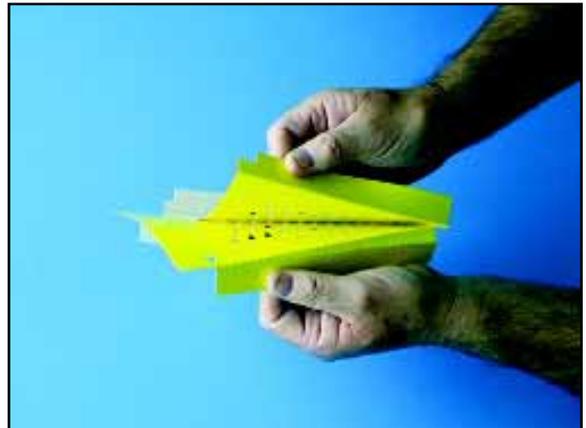
3. Turn the trap over and fold the two flaps on both sides along the serrated lines to form the triangular side panels. Make the folds neat and complete so that there are no gaps along the sides that would allow flies to enter the inside of the trap.



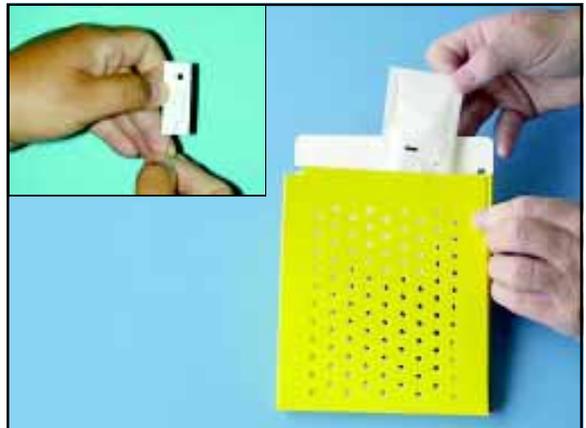
5. Fold the two sides together along the two creased lines at the bottom, so that the sticky surfaces face out.



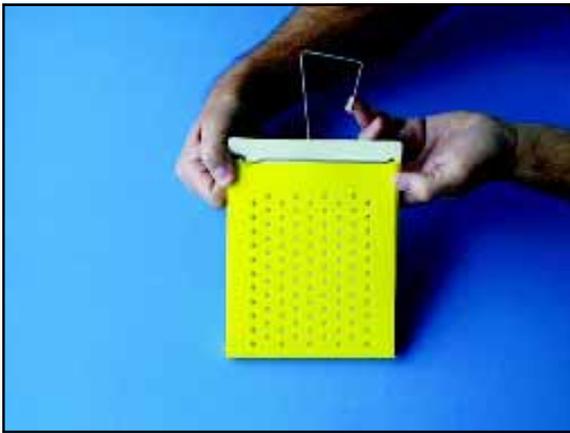
2. Assemble the trap. One side of the trap has two rectangular flaps. Before pulling the trap open, fold these two flaps in along the crease. Write the trap number on the outside of the yellow flap (upside down as shown) and the inside white area.



4. Pull the trap open from the sides to prevent the trap from being misshapen (this is important).



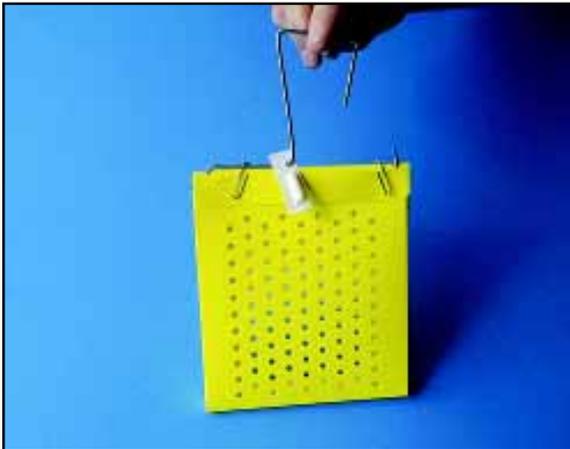
6. Insert the food packet into the center space of the trap. Place the trap back in a trap holder. Prepare a pheromone capsule (see inset) by putting a pin hole at the bottom end (this can also be done at the trap site).



7. Slide the pheromone capsule onto the end of the trap hanger. Insert the trap hanger under the top flap of the trap from the side without a hole, so that the end of the hanger will fit into the hole at the opposite end.



8. Secure the flap closed using two paper clips. Clean up with Gojo or a similar hand cleaner.



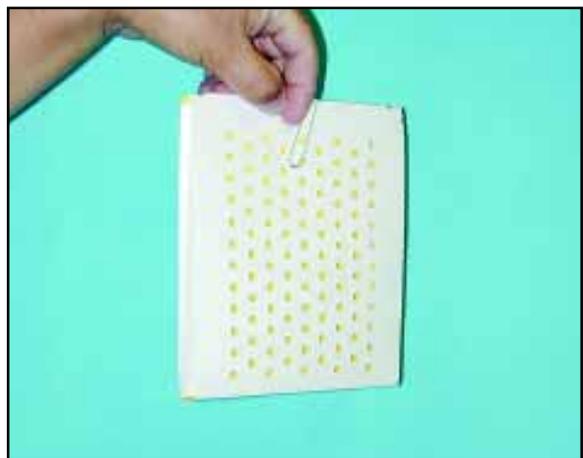
9. Completed trap with pheromone capsule attached. Pheromone capsule can also be placed at the closed end of the trap hanger.



10. A specimen of Olive fruit fly on a ChamP™ trap.



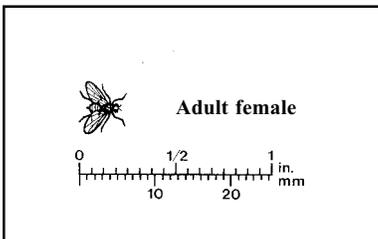
11. Be sure to inspect the bottom, as well as the side panels of the trap, carefully for specimens.



12. To submit a specimen, fold the trap in reverse order so that the side flaps and yellow panels face sticky side in. Maintain an air space between the sticky yellow panels to protect the specimen and secure the trap closed with a paperclip.



Photo by Robert Copeland ©



**OLIVE FRUIT FLY**  
*Bactrocera oleae* (Gmelin)

